US005933478A

United States Patent [19]

Ozaki et al.

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[45] Date of Patent: *Aug. 3, 1999

[54] **DATA TRANSFER SYSTEM AND HANDHELD TERMINAL DEVICE USED THEREFOR**

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[73] Assignee: **Hitachi, Ltd.**, Tokyo, Japan

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **08/534,318**

[22] Filed: **Sep. 27, 1995**

[30] **Foreign Application Priority Data**

Sep. 28, 1994 [JP] Japan 6-233226
Mar. 23, 1995 [JP] Japan 7-064288

[51] **Int. Cl.**[6] **H04M 11/00**

[52] **U.S. Cl.** **379/93.24**; 379/100.08; 379/93.23; 379/90.01; 455/412; 455/38.4

[58] **Field of Search** 379/96, 93, 97, 379/98, 100, 110, 90, 56, 57, 58, 59, 90.01, 93.17, 93.23, 93.24, 100.08, 100.14; 358/442, 400, 401, 402, 407, 434, 468; 340/825.44; 455/412, 413, 556, 557, 575, 31.1–31.3

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Primary Examiner—Stella Woo
Attorney, Agent, or Firm—Antonelli, Terry, Stout & Kraus, LLP

[57] **ABSTRACT**

In the handheld terminal device, when a message reception unit receives from a host computer a new arrival message indicating a new arrival of a file (or electronic mail), a control unit analyzes the new arrival message to obtain identifier information for identifying the file (or electronic mail) and a telephone number of the host computer. After a line connection to the host computer is established by a handheld phone transceiver unit, a fetch request command for fetching the file (or electronic mail) is transmitted to automatically fetch the file (or electronic mail) from the host computer and make the user know the contents of the file (or electronic mail) by using a display unit. A FAX transmitting user designates a destination handheld terminal device and transmits FAX image data to a communication server (CS). CS stores the received FAX image data and transmits a FAX arrival message to a pager connected to the destination handheld terminal device. A user of the handheld terminal device informed of a FAX arrival by the pager confirms the FAX brief image data contained in the message, and if necessary, calls CS by a handheld phone connected to the handheld terminal device to make CS transmit the FAX image data and refer to the detailed contents thereof.

24 Claims, 32 Drawing Sheets

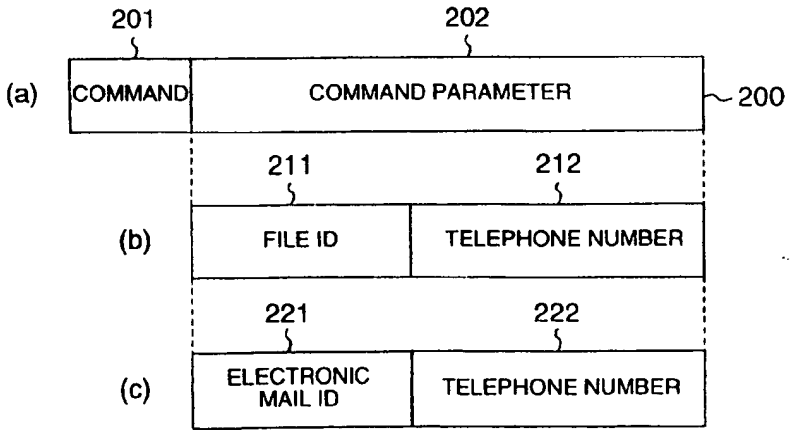


FIG.1

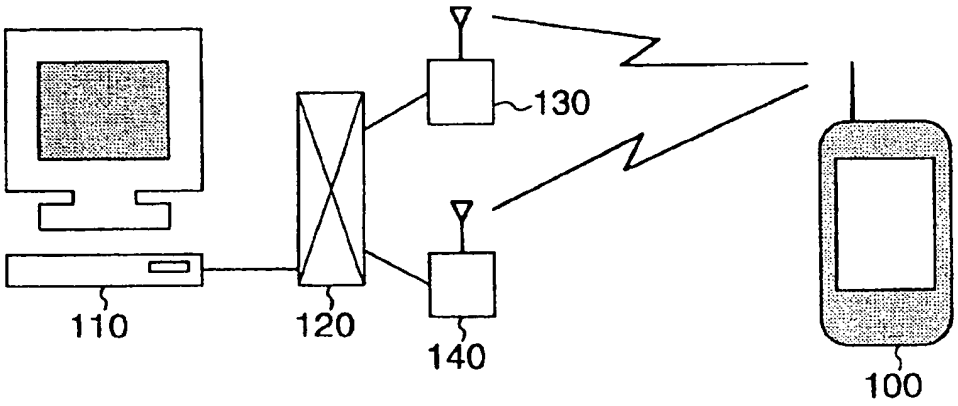

130
110
120
140
100

FIG.2

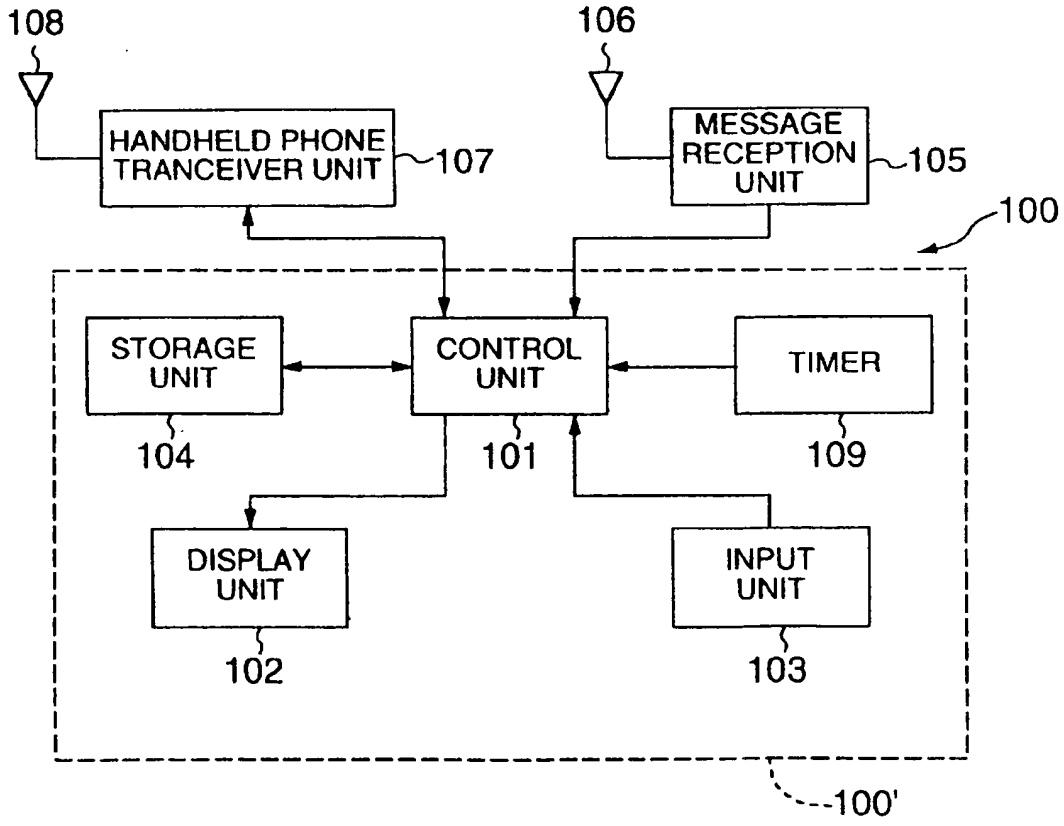

108
106
HANDHELD PHONE TRANCEIVER UNIT
107
MESSAGE RECEPTION UNIT
105
100
STORAGE UNIT
CONTROL UNIT
TIMER
104
101
109
DISPLAY UNIT
INPUT UNIT
102
103
100'

FIG.3

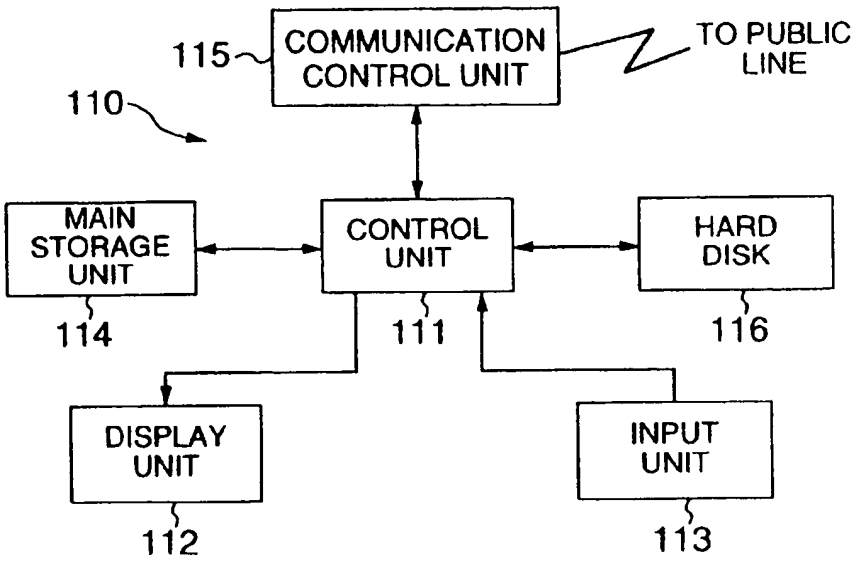

115
COMMUNICATION CONTROL UNIT
TO PUBLIC LINE
110
MAIN STORAGE UNIT
CONTROL UNIT
HARD DISK
114
111
116
DISPLAY UNIT
INPUT UNIT
112
113

FIG.4

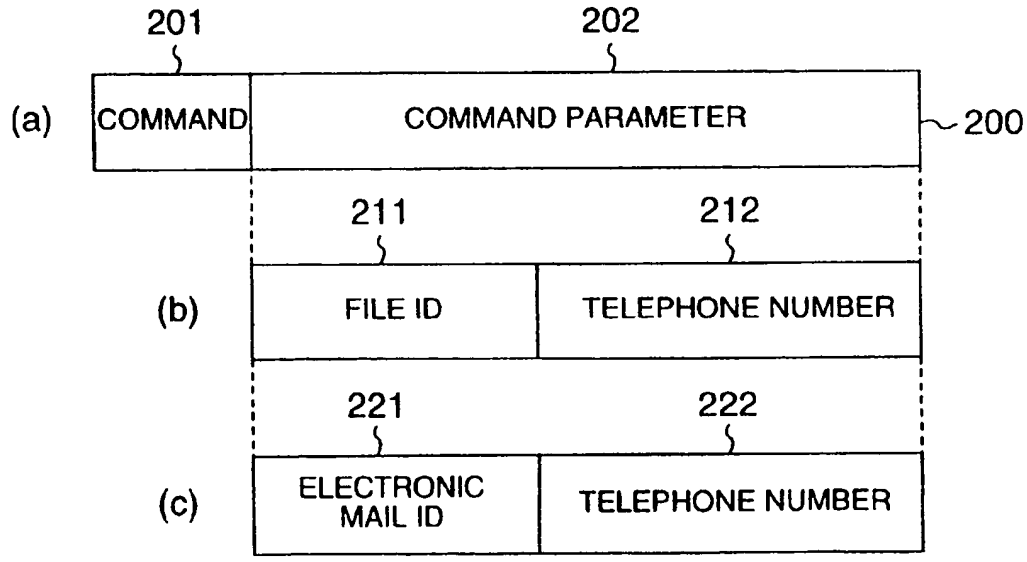

201
202
(a)
COMMAND
COMMAND PARAMETER
200
211
212
(b)
FILE ID
TELEPHONE NUMBER
221
222
(c)
ELECTRONIC MAIL ID
TELEPHONE NUMBER

FIG.5

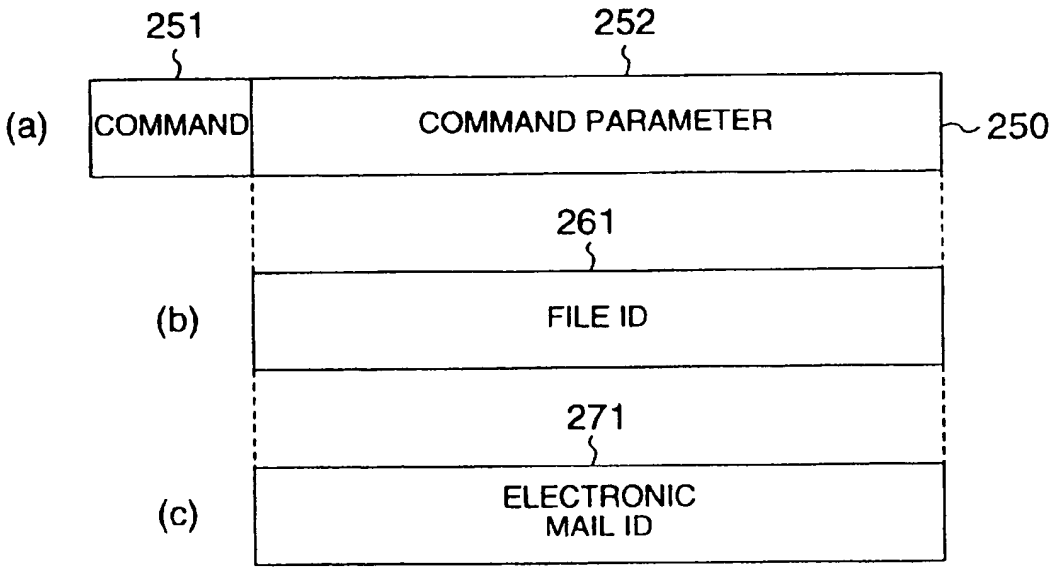

251
252
(a)
COMMAND
COMMAND PARAMETER
250
261
(b)
FILE ID
271
(c)
ELECTRONIC MAIL ID

FIG.6

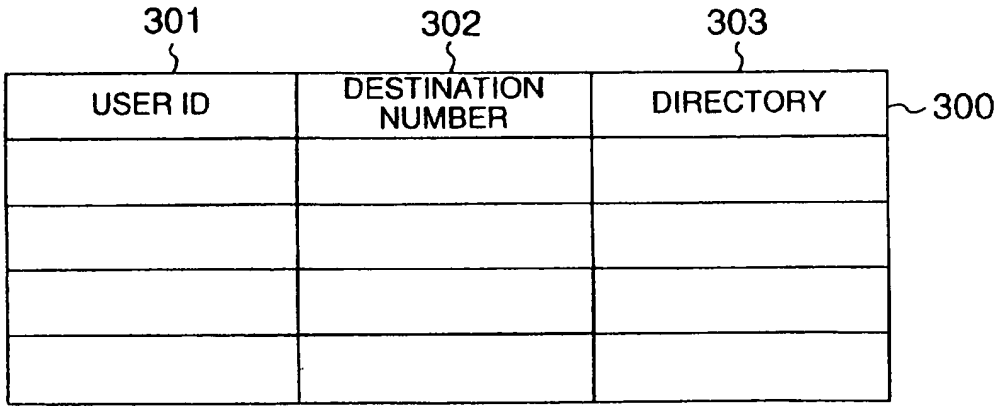

301
302
303
USER ID
DESTINATION NUMBER
DIRECTORY
300

FIG.7

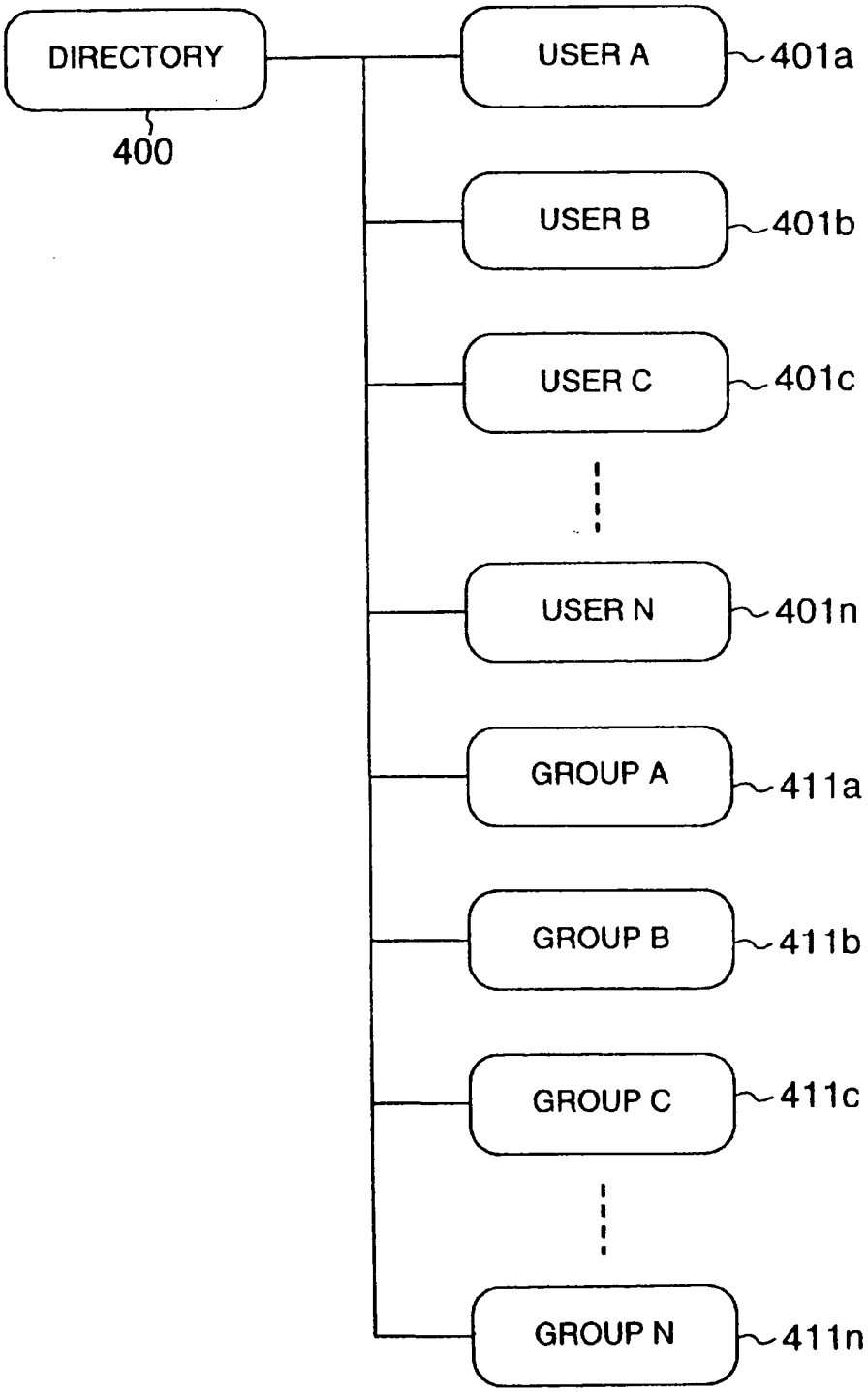

DIRECTORY
400
USER A
401a
USER B
401b
USER C
401c
USER N
401n
GROUP A
411a
GROUP B
411b
GROUP C
411c
GROUP N
411n

FIG.8

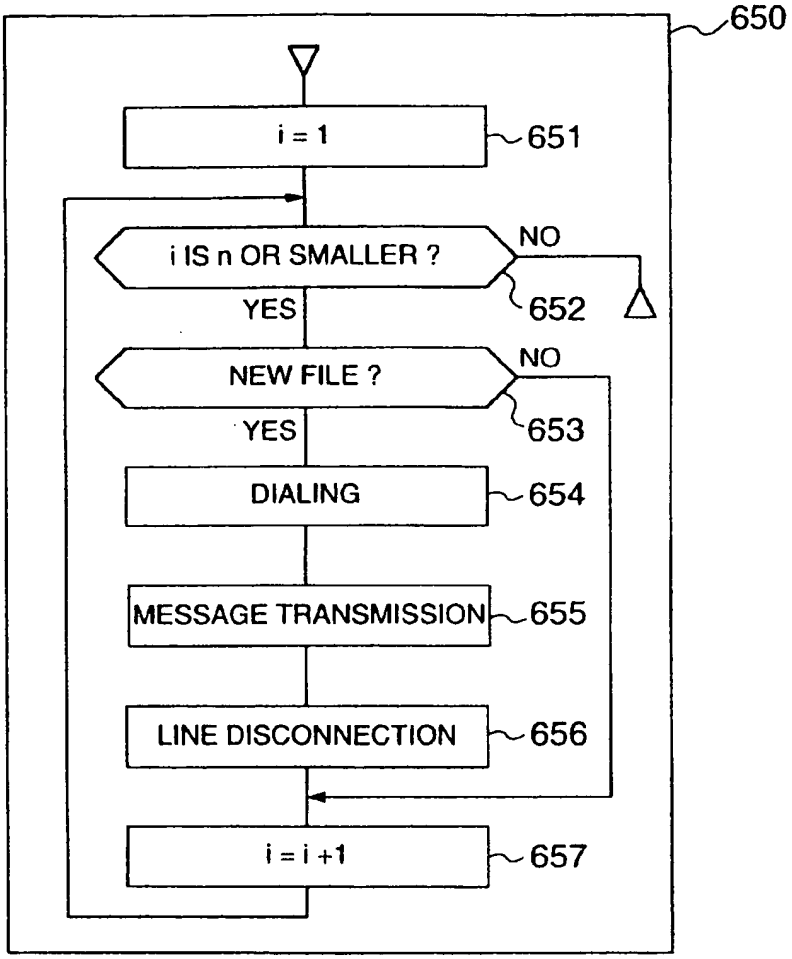

650
i = 1
651
i IS n OR SMALLER ?
NO
652
YES
NEW FILE ?
NO
653
YES
DIALING
654
MESSAGE TRANSMISSION
655
LINE DISCONNECTION
656
i = i +1
657

FIG.9

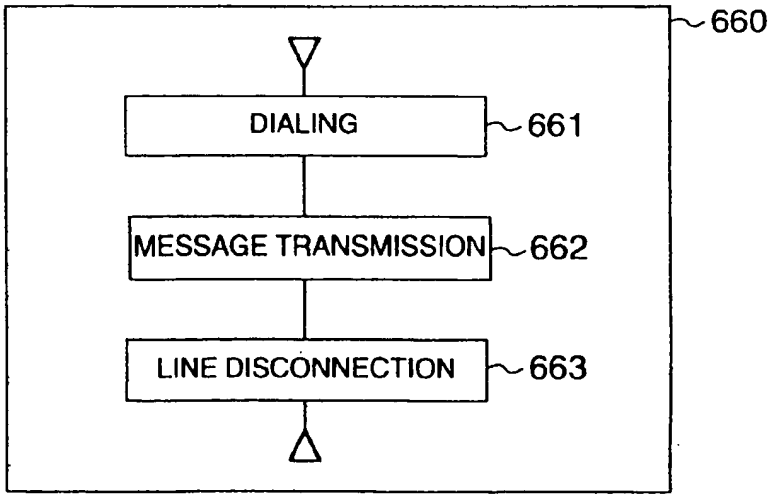

660
DIALING
661
MESSAGE TRANSMISSION
662
LINE DISCONNECTION
663

FIG.10

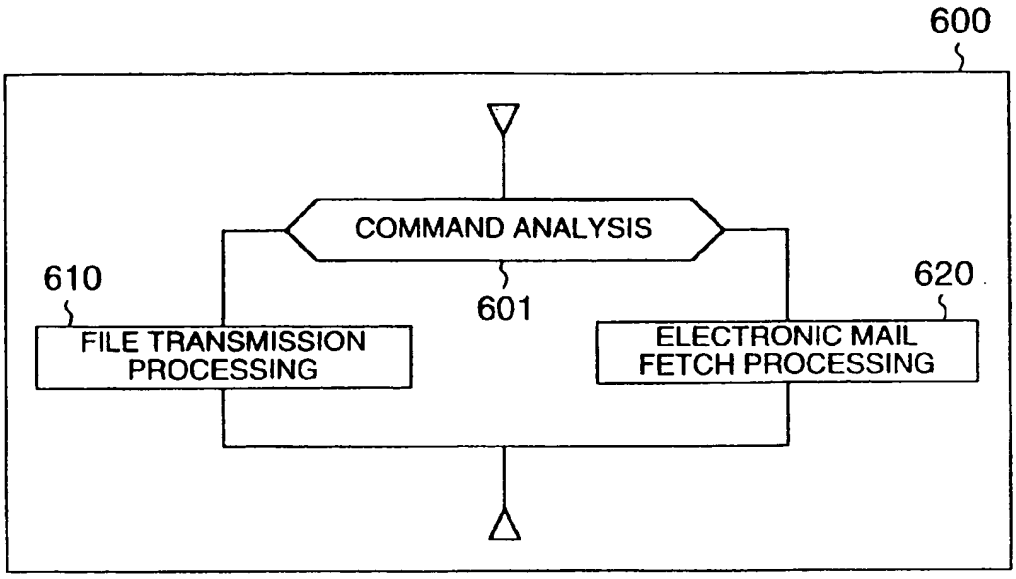

600
COMMAND ANALYSIS
601
610
FILE TRANSMISSION PROCESSING
620
ELECTRONIC MAIL FETCH PROCESSING

FIG.11

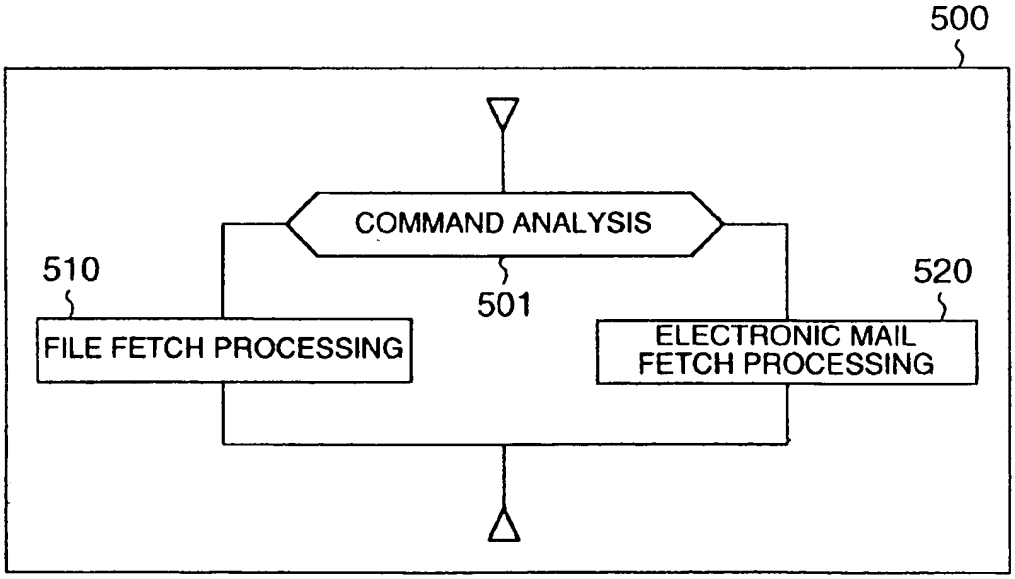

500
COMMAND ANALYSIS
501
510
FILE FETCH PROCESSING
520
ELECTRONIC MAIL FETCH PROCESSING

FIG.12

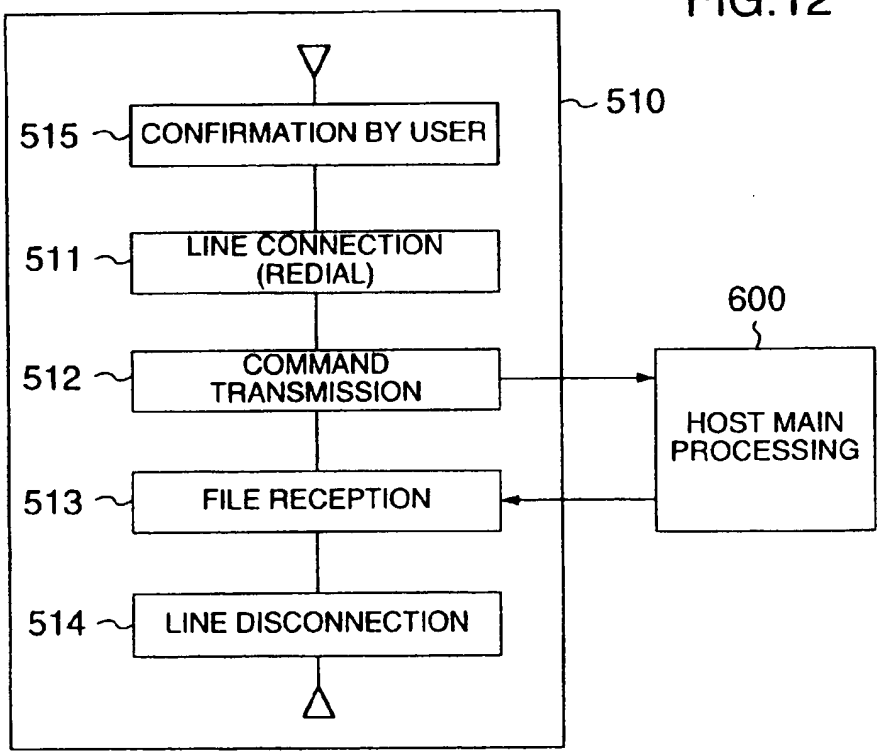

510
515
CONFIRMATION BY USER
511
LINE CONNECTION (REDIAL)
512
COMMAND TRANSMISSION
513
FILE RECEPTION
514
LINE DISCONNECTION
600
HOST MAIN PROCESSING

FIG.13

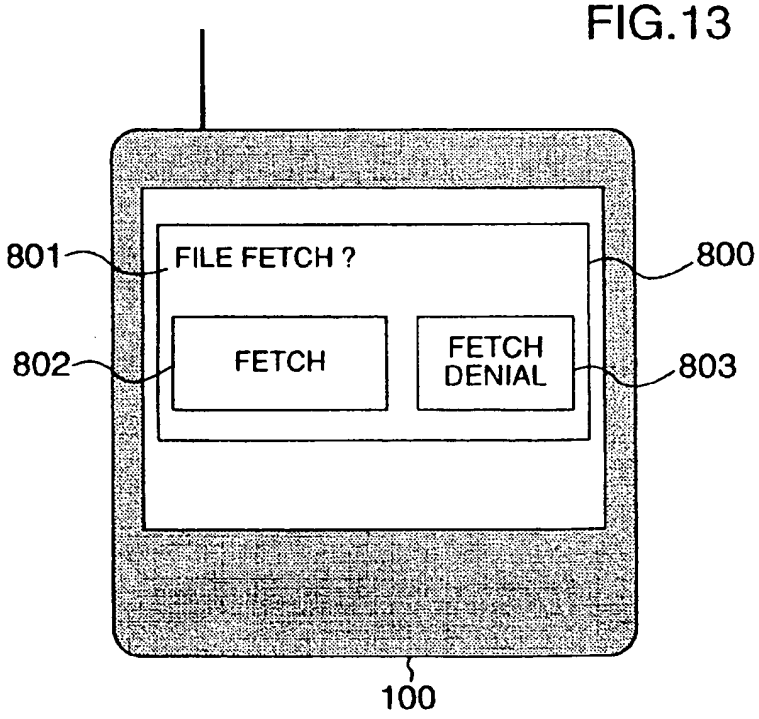

801
FILE FETCH ?
800
802
FETCH
FETCH DENIAL
803
100

FIG.14

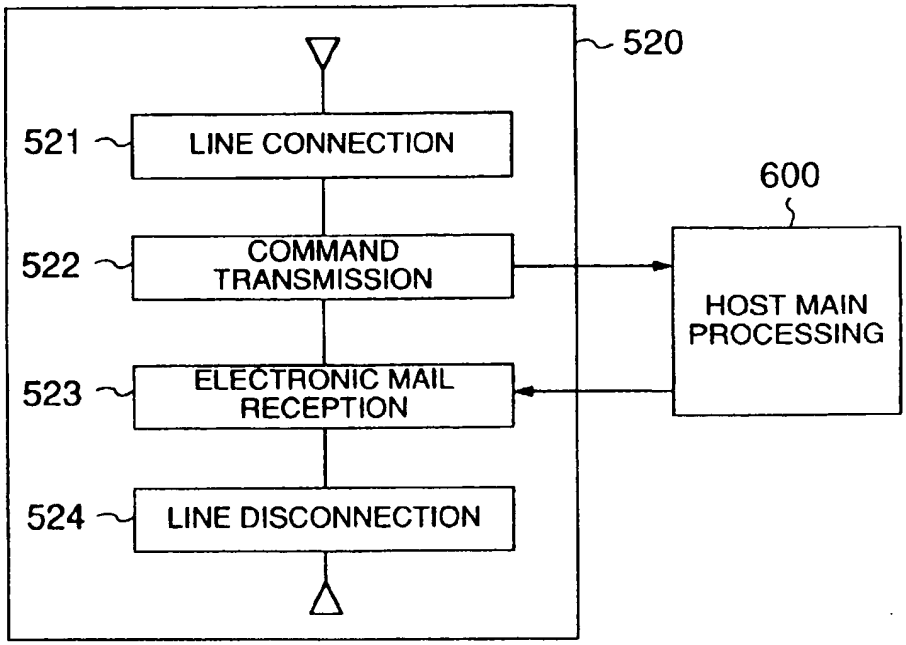

520
521
LINE CONNECTION
522
COMMAND TRANSMISSION
523
ELECTRONIC MAIL RECEPTION
524
LINE DISCONNECTION
600
HOST MAIN PROCESSING

FIG.15

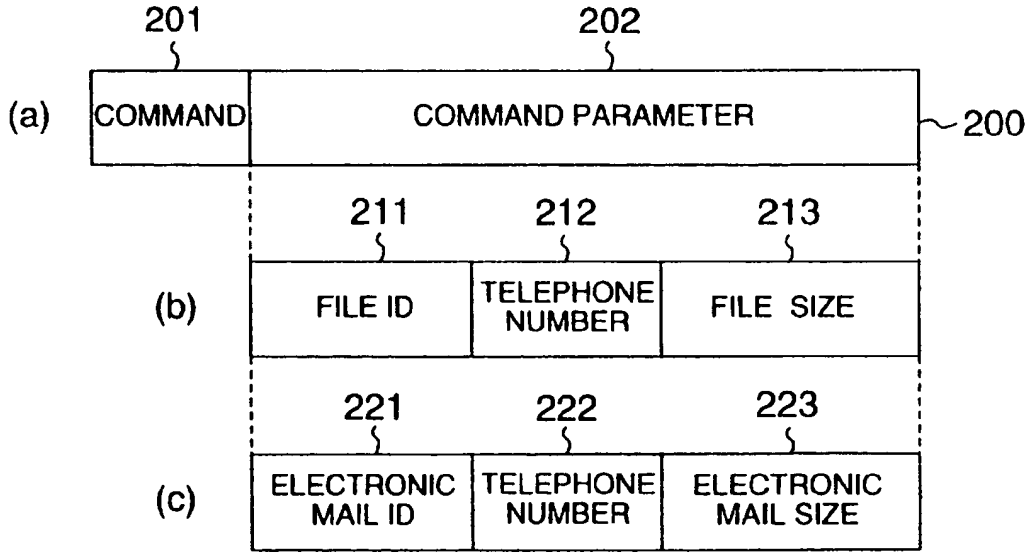

201
202
(a)
COMMAND
COMMAND PARAMETER
200
211
212
213
(b)
FILE ID
TELEPHONE NUMBER
FILE SIZE
221
222
223
(c)
ELECTRONIC MAIL ID
TELEPHONE NUMBER
ELECTRONIC MAIL SIZE

FIG.16

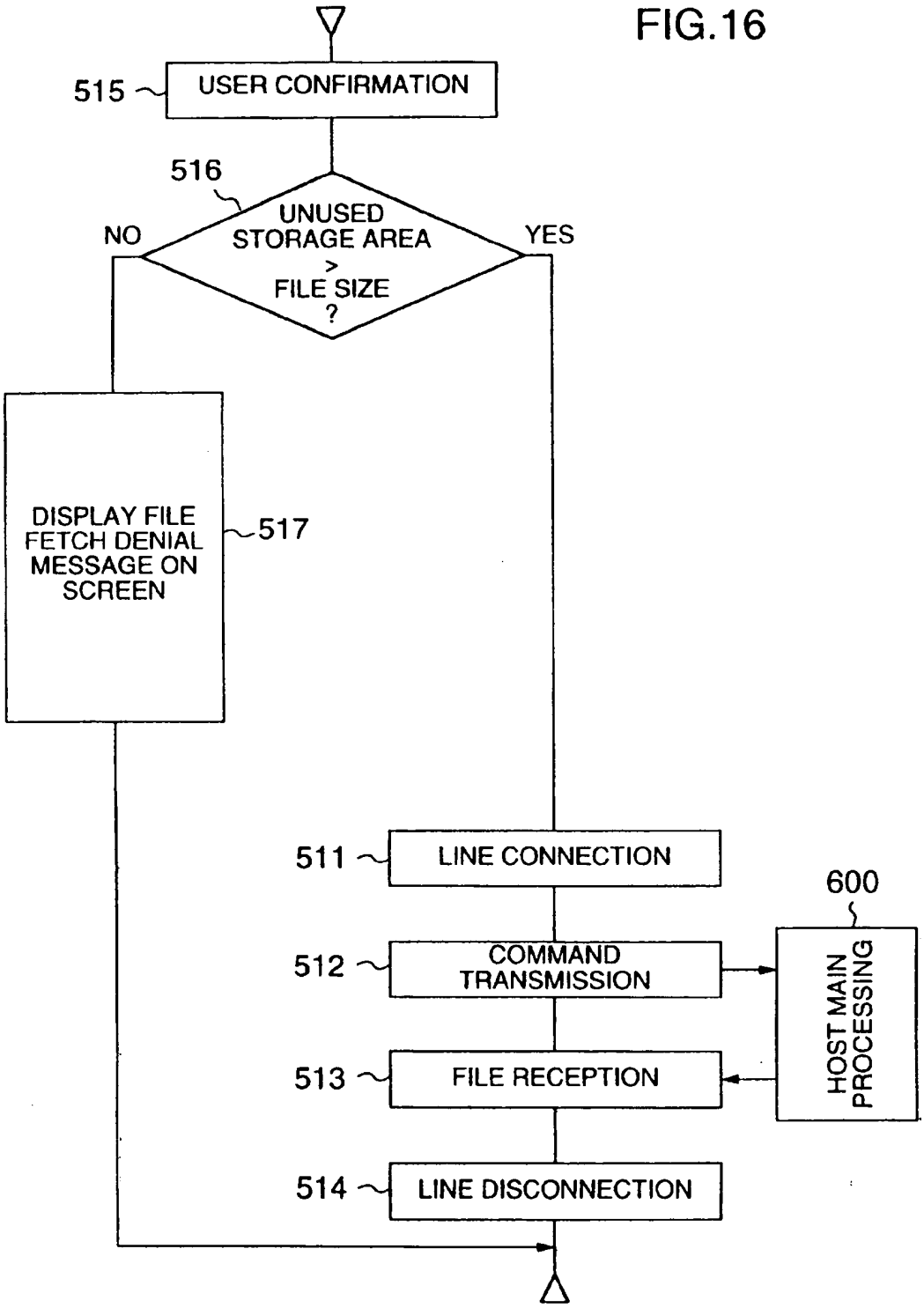

515
USER CONFIRMATION
516
UNUSED STORAGE AREA > FILE SIZE ?
NO
YES
DISPLAY FILE FETCH DENIAL MESSAGE ON SCREEN
517
511
LINE CONNECTION
600
512
COMMAND TRANSMISSION
HOST MAIN PROCESSING
513
FILE RECEPTION
514
LINE DISCONNECTION

FIG.17A

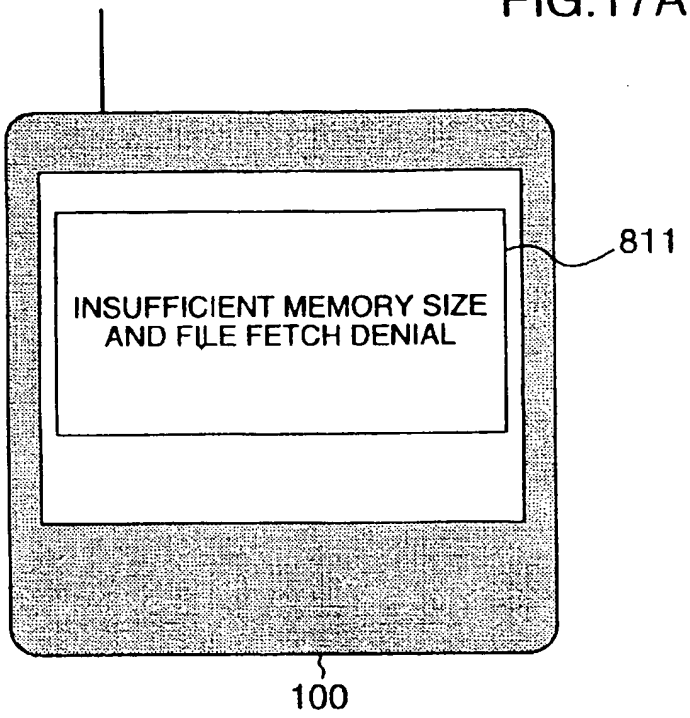


FIG.17B

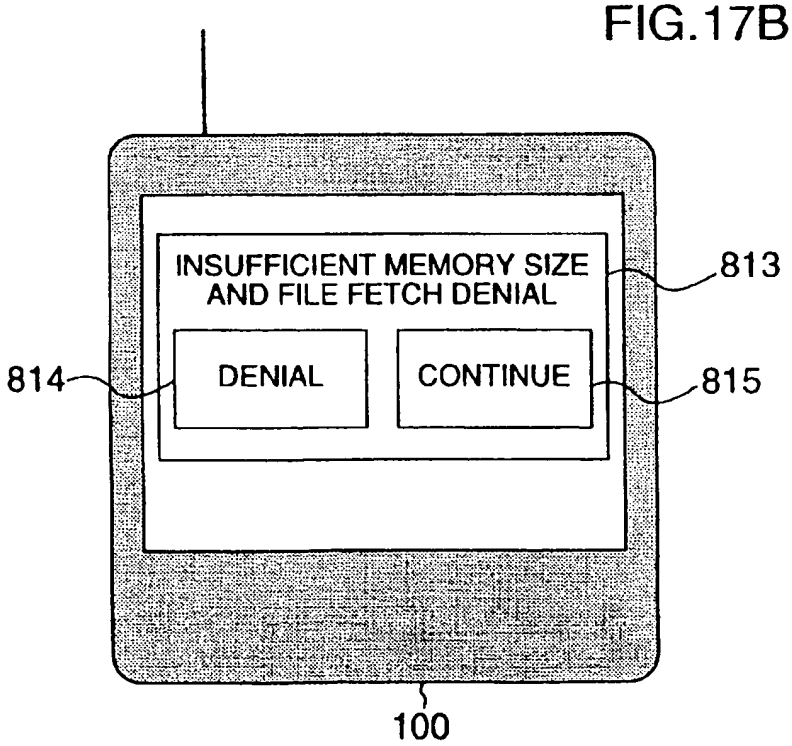


FIG.18

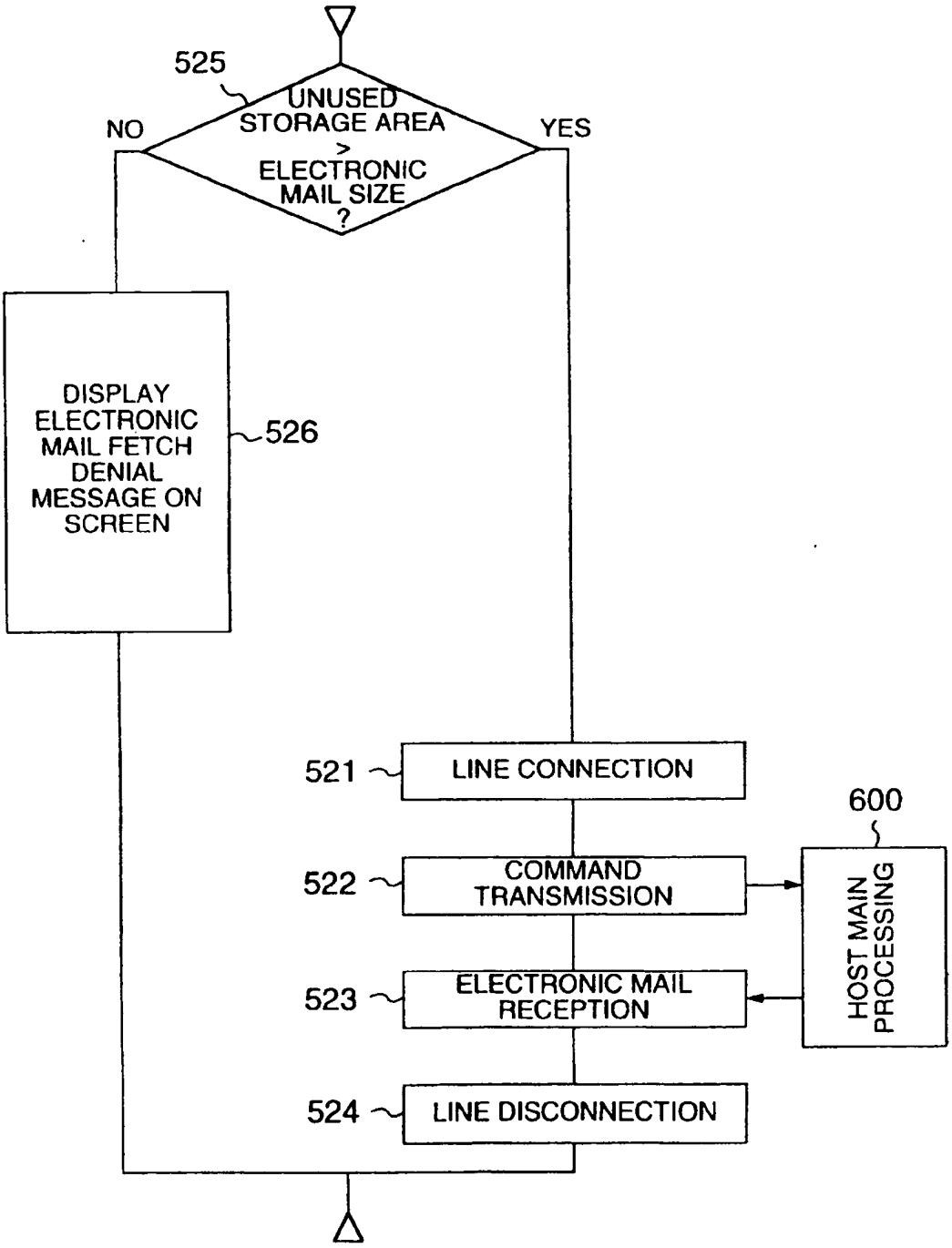

525
UNUSED STORAGE AREA > ELECTRONIC MAIL SIZE ?
NO
YES
DISPLAY ELECTRONIC MAIL FETCH DENIAL MESSAGE ON SCREEN
526
521
LINE CONNECTION
600
522
COMMAND TRANSMISSION
523
ELECTRONIC MAIL RECEPTION
HOST MAIN PROCESSING
524
LINE DISCONNECTION

FIG.19

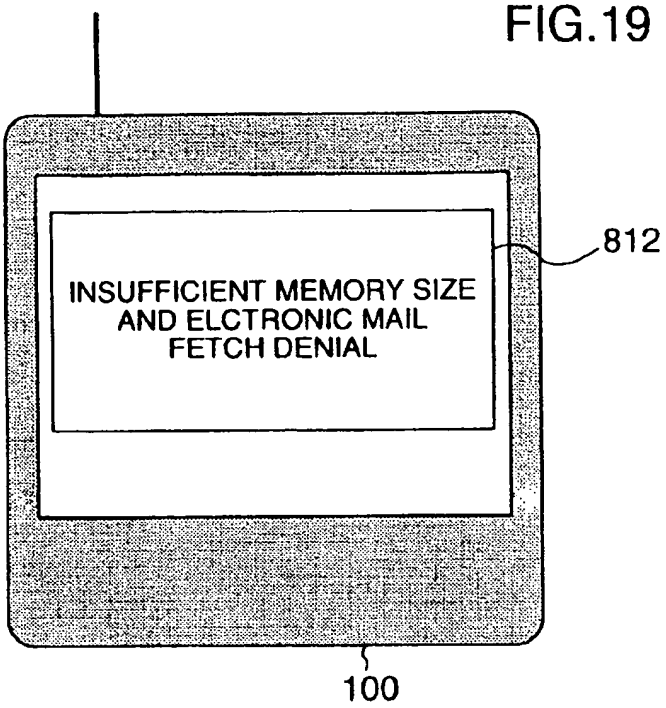

INSUFFICIENT MEMORY SIZE AND ELCTRONIC MAIL FETCH DENIAL
812
100

FIG.20

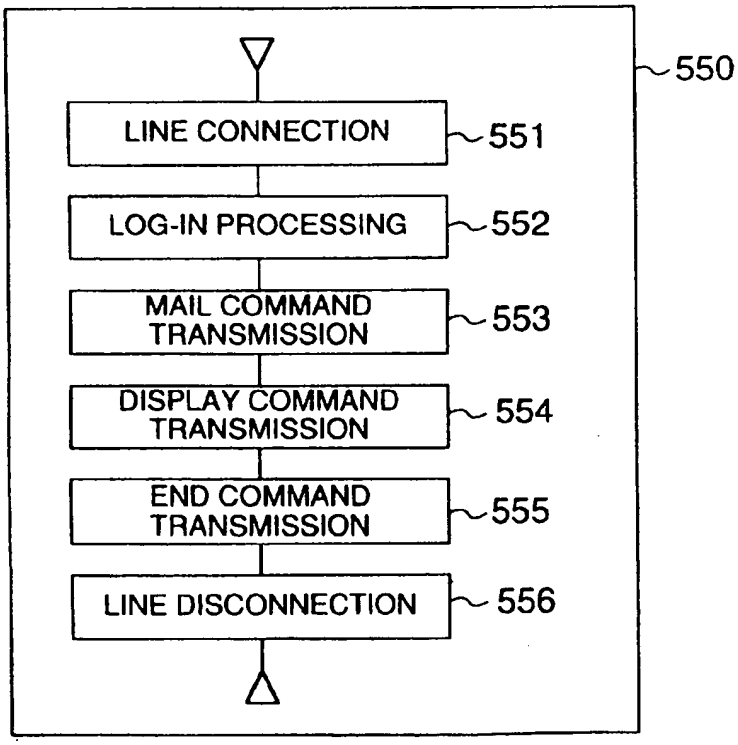

550
LINE CONNECTION
551
LOG-IN PROCESSING
552
MAIL COMMAND TRANSMISSION
553
DISPLAY COMMAND TRANSMISSION
554
END COMMAND TRANSMISSION
555
LINE DISCONNECTION
556

FIG.21

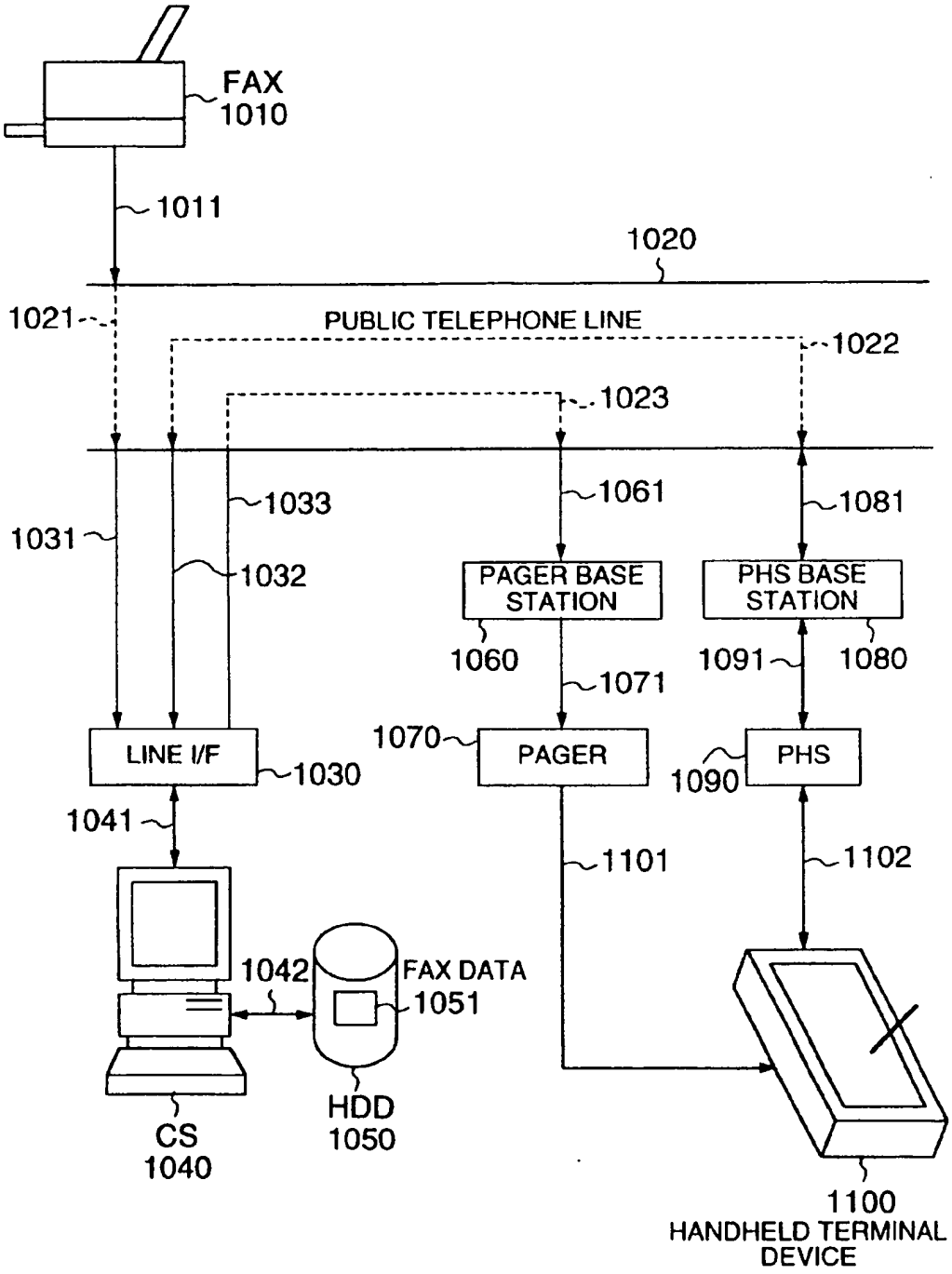

FAX
1010
1011
1020
1021
PUBLIC TELEPHONE LINE
1022
1023
1033
1061
1081
1031
1032
PAGER BASE STATION
PHS BASE STATION
1060
1071
1091
1080
LINE I/F
1030
1070
PAGER
PHS
1090
1041
1101
1102
1042
FAX DATA
1051
HDD
1050
CS
1040
1100
HANDHELD TERMINAL DEVICE

FIG.22A

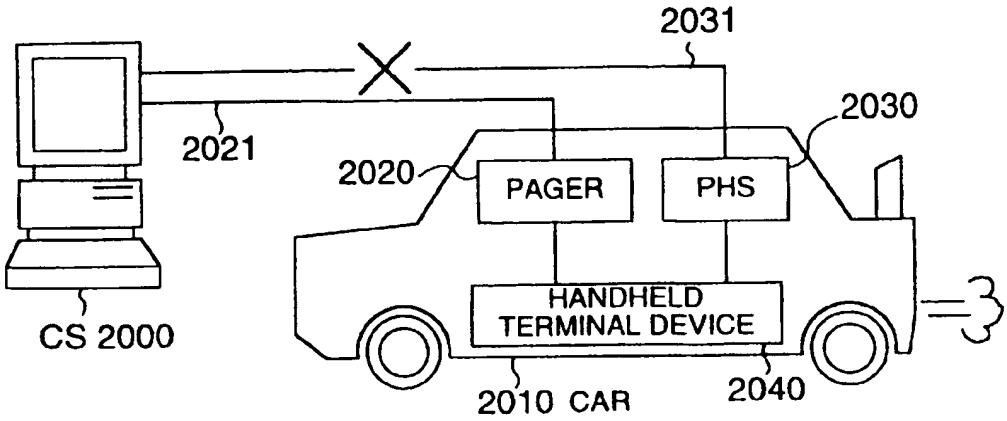


FIG.22B

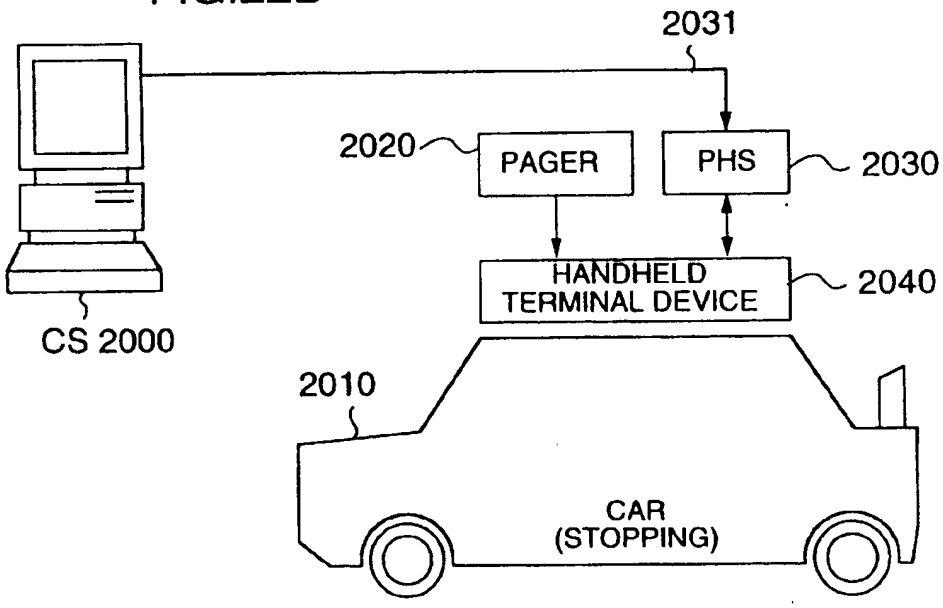


FIG.22C

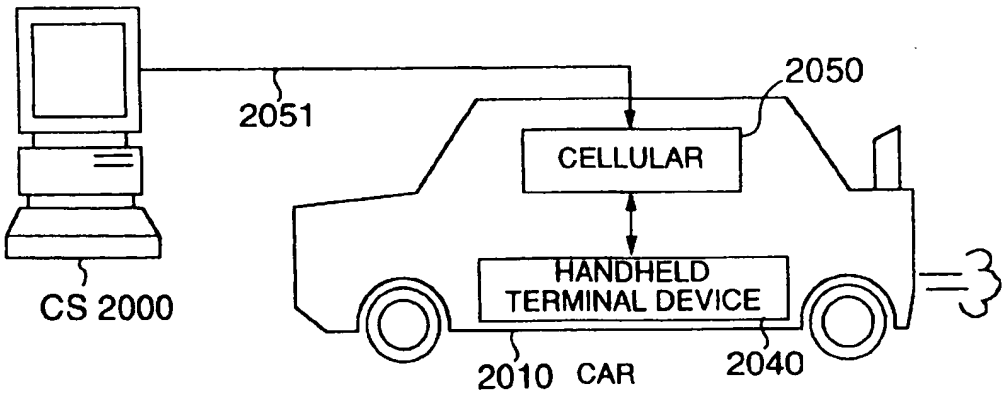


FIG.23

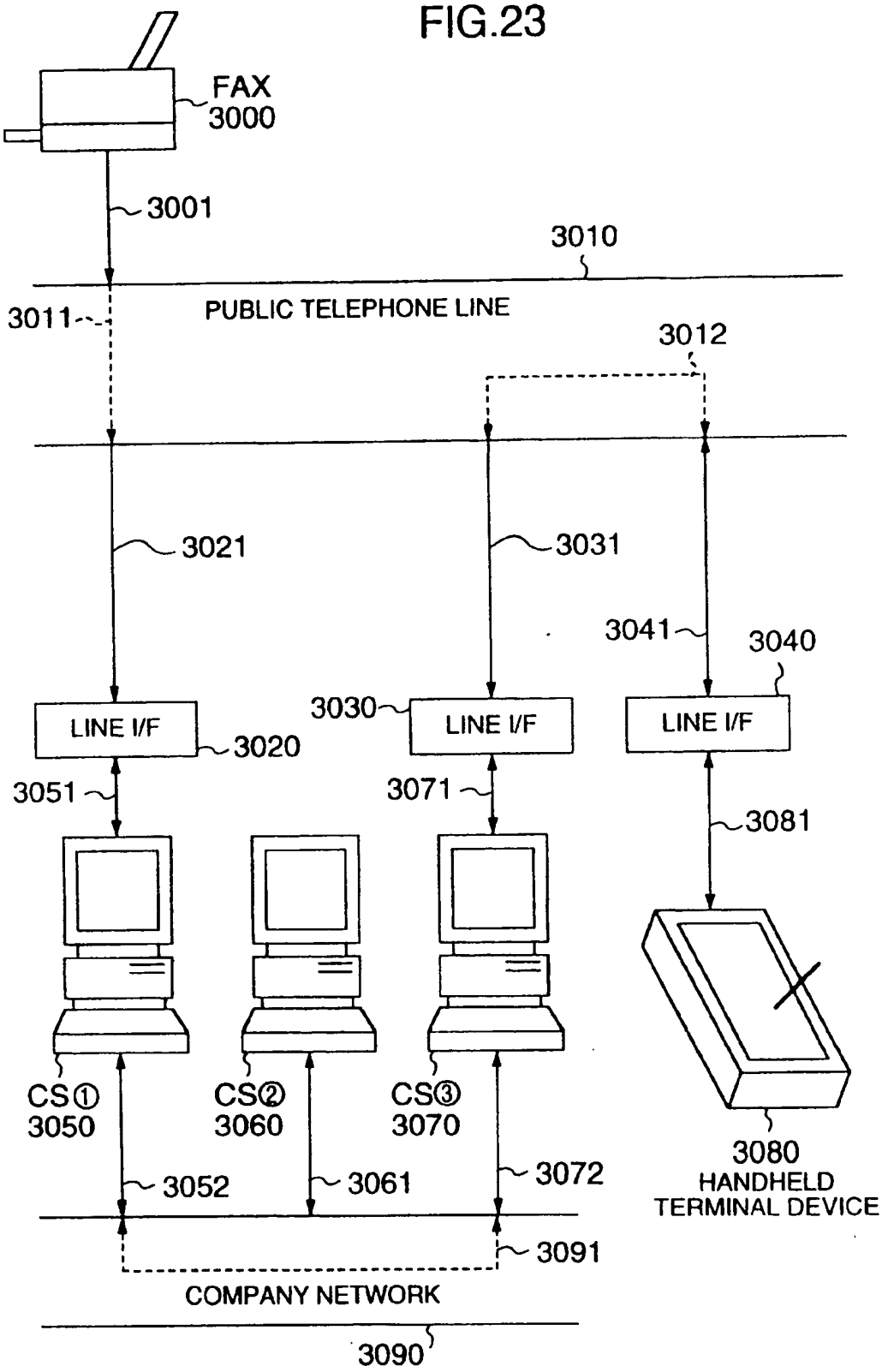

FAX
3000
3001
3010
PUBLIC TELEPHONE LINE
3011
3012
3021
3031
3041
3040
LINE I/F
3020
3030
LINE I/F
LINE I/F
3051
3071
3081
CS①
3050
CS②
3060
CS③
3070
3080
HANDHELD
TERMINAL DEVICE
3052
3061
3072
3091
COMPANY NETWORK
3090

FIG.24

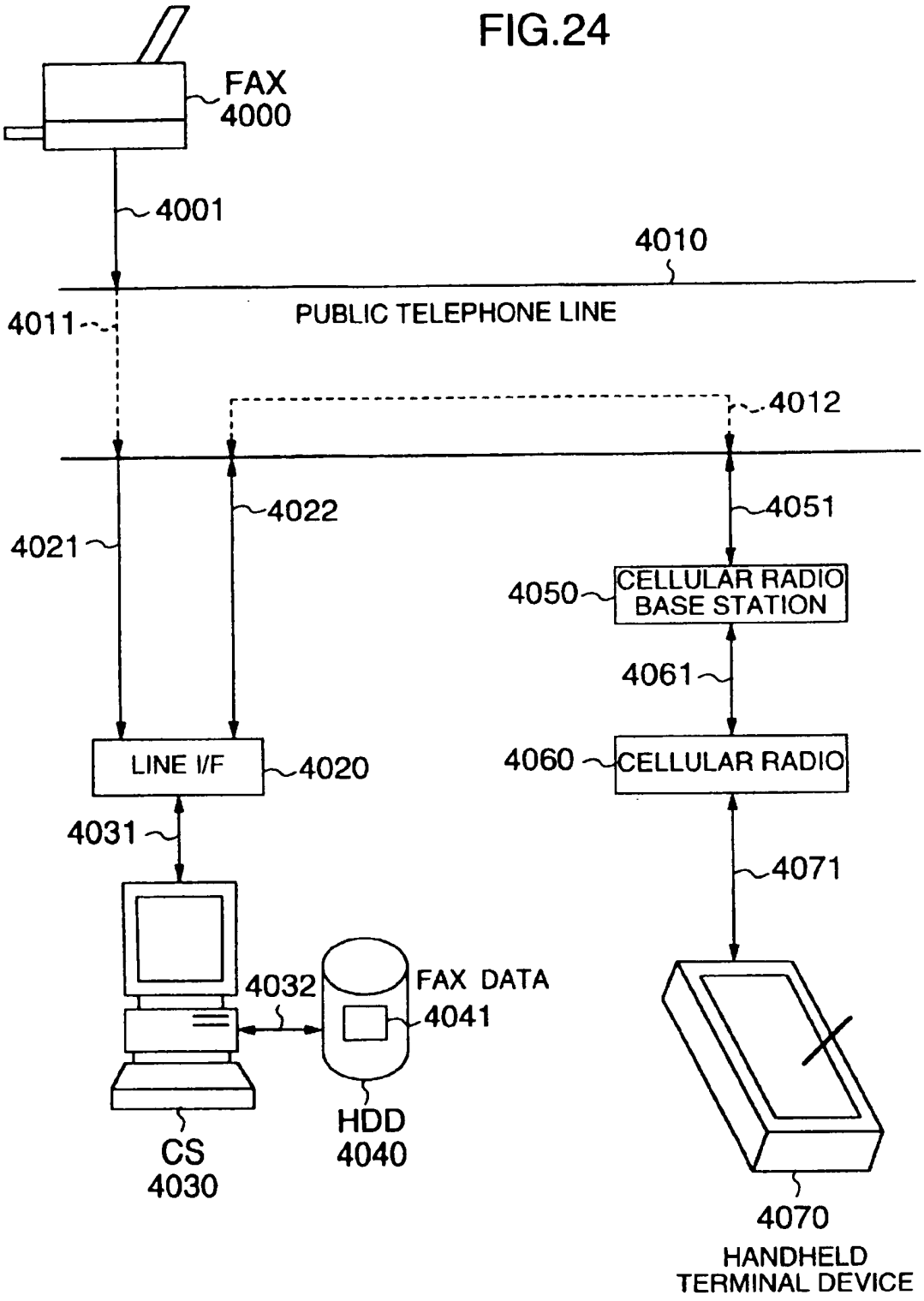

FAX
4000
4001
4010
PUBLIC TELEPHONE LINE
4011
4012
4022
4051
4021
4050
CELLULAR RADIO BASE STATION
4061
LINE I/F
4020
4060
CELLULAR RADIO
4031
4071
4032
FAX DATA
4041
HDD
4040
CS
4030
4070
HANDHELD TERMINAL DEVICE

FIG.25

	TRANSMISSION STATION	DESTINATION STATION	MESSAGE CONTENTS	FORMAT	TRANSMISSION CONDITION
①	FAX	EXCHANGER	CS CALL TEL #	TONE/DIAL	EXCHANGER CARRIER
②	FAX	CS	HTD NUMBER	TONE	CS CARRIER
③	FAX	CS	FAX IMAGE	DIGITAL SIGNAL	CS CARRIER
④	CS	EXCHANGER	PAGER CALL #	TONE/DIAL	EXCHANGER CARRIER
⑤	CS	HTD	FAX ARRIVAL MESSAGE	DIGITAL SIGNAL	PAGER CARRIER
⑥	HTD	EXCHANGER	CS CALL TEL #	TONE/DIAL	EXCHANGER CARRIER
⑦	HTD	CS	FAX TRANS-MISSION REQUEST	DIGITAL SIGNAL	CS CARRIER
⑧	CS	HTD	FAX IMAGE	DIGITAL SIGNAL	HTD CARRIER

FIG.26

	TRANSMISSION STATION	DESTINATION STATION	MESSAGE CONTENTS	FORMAT	TRANSMISSION CONDITION
①	FAX	EXCHANGER	CS CALL TEL #	TONE/DIAL	EXCHANGER CARRIER
②	FAX	CS	HTD NUMBER	DIGITAL SIGNAL	CS CARRIER
③	FAX	CS	FAX IMAGE	DIGITAL SIGNAL	CS CARRIER
④	CS	EXCHANGER	PAGER CALL #	TONE/DIAL	EXCHANGER CARRIER
⑤	CS	HTD	FAX ARRIVAL MESSAGE	DIGITAL SIGNAL	PAGER CARRIER
⑥	HTD	EXCHANGER	CS CALL TEL #	TONE/DIAL	EXCHANGER CARRIER
⑦	HTD	CS	FAX TRANS-MISSION REQUEST	DIGITAL SIGNAL	CS CARRIER
⑧	CS	HTD	FAX IMAGE	DIGITAL SIGNAL	HTD CARRIER

FIG.27

	TRANSMISSION STATION	DESTINATION STATION	MESSAGE CONTENTS	FORMAT	TRANSMISSION CONDITION
①	FAX	EXCHANGER	CS CALL TEL #	TONE/DIAL	EXCHANGER CARRIER
②	FAX	CS	HTD NUMBER	DIGITAL SIGNAL	CS CARRIER
③	FAX	CS	FAX HEADER	DIGITAL SIGNAL	CS CARRIER
④	FAX	CS	FAX IMAGE	DIGITAL SIGNAL	CS CARRIER
⑤	CS	EXCHANGER	PAGER CALL #	TONE/DIAL	EXCHANGER CARRIER
⑥	CS	HTD	FAX ARRIVAL MESSAGE	DIGITAL SIGNAL	PAGER CARRIER
⑦	HTD	EXCHANGER	CS CALL TEL #	TONE/DIAL	EXCHANGER CARRIER
⑧	HTD	CS	FAX TRANS-MISSION REQUEST	DIGITAL SIGNAL	CS CARRIER
⑨	CS	HTD	FAX HEADER	DIGITAL SIGNAL	HTD CARRIER
⑩	CS	HTD	FAX IMAGE	DIGITAL SIGNAL	HTD CARRIER

09/04/2003, EAST Version: 1.04.0000

SIGNAL CONTENTS TRANSMITTED BY FAX

FIG.28A

FAX HEADER (IMAGE.RUN-LENGTH FORMAT)
FAX IMAGE (IMAGE.RUN-LENGTH FORMAT)

SIGNAL CONTENTS TRASFERRED FROM CS TO PAGER OF HANDHELD TERMINAL DEVICE

FIG.28B

FAX HEADER (CHARACTER CODE.RECEIVED IMAGE IS CONVERTED THROUGH CHARACTER RECOGNITION)

SIGNAL CONTENTS TRANSMITTED BY CS

FIG.28C

FAX HEADER (IMAGE.RUN-LENGTH FORMAT)
FAX IMAGE (IMAGE. RUN-LENGTH FORMAT)

FIG.29

	MESSAGE TRANSMITTED FROM CS TO PAGER OF HANDHELD TERMINAL DEVICE
①	FAX ARRIVAL MESSAGE (COMMAND)
②	FAX TRANSMISSION MESSAGE (NAME,TEL NO.,etc.)
③	RECEIVE DATE AND TIME
④	CALL TEL NUMBER OF RECEIVED CS
⑤	ID OF RECEIVED CS
⑥	MANAGEMENT NUMBER OF FAX IMAGES AT CS
⑦	LENGTH OF RECEIVED FAX IMAGE DATA
⑧	HEADER CHARACTER OF RECEIVED FAX IMAGE DATA (THROUGH CHARACTER RECOGNITION OF HEADER)

FIG.30

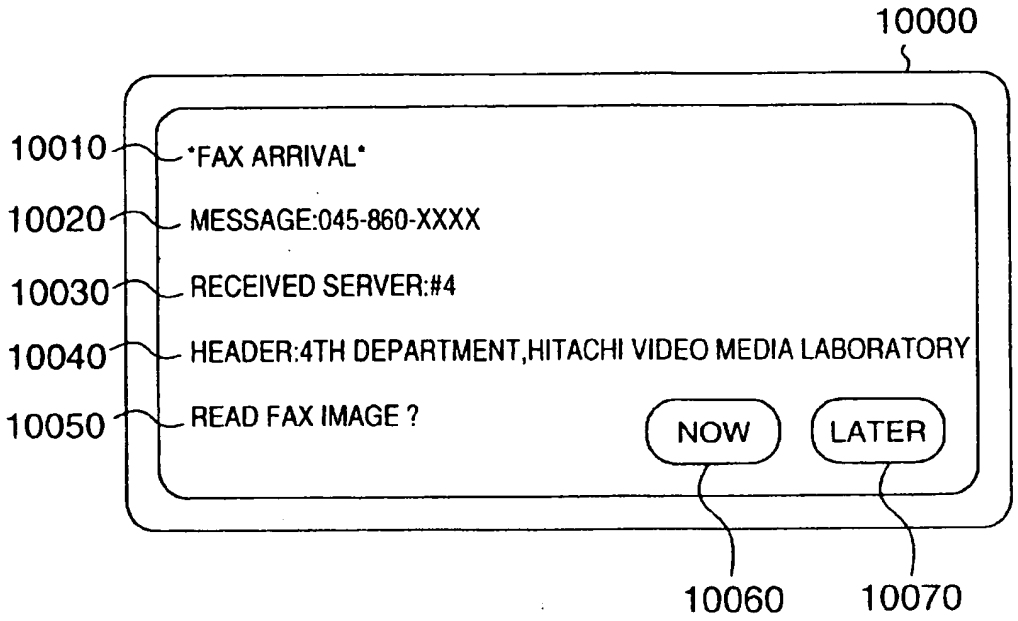

10000
10010
FAX ARRIVAL
10020
MESSAGE:045-860-XXXX
10030
RECEIVED SERVER:#4
10040
HEADER:4TH DEPARTMENT,HITACHI VIDEO MEDIA LABORATORY
10050
READ FAX IMAGE ?
NOW
LATER
10060
10070

FIG.31

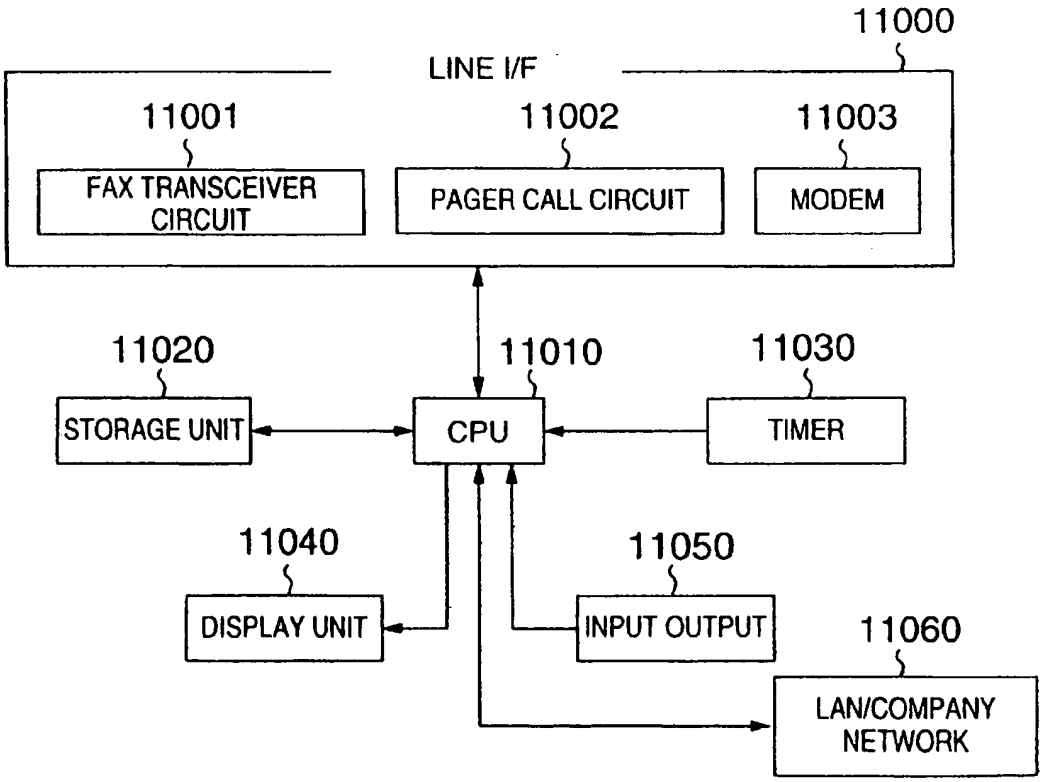

11000
LINE I/F
11001
FAX TRANSCEIVER CIRCUIT
11002
PAGER CALL CIRCUIT
11003
MODEM
11020
STORAGE UNIT
11010
CPU
11030
TIMER
11040
DISPLAY UNIT
11050
INPUT OUTPUT
11060
LAN/COMPANY NETWORK

FIG.32

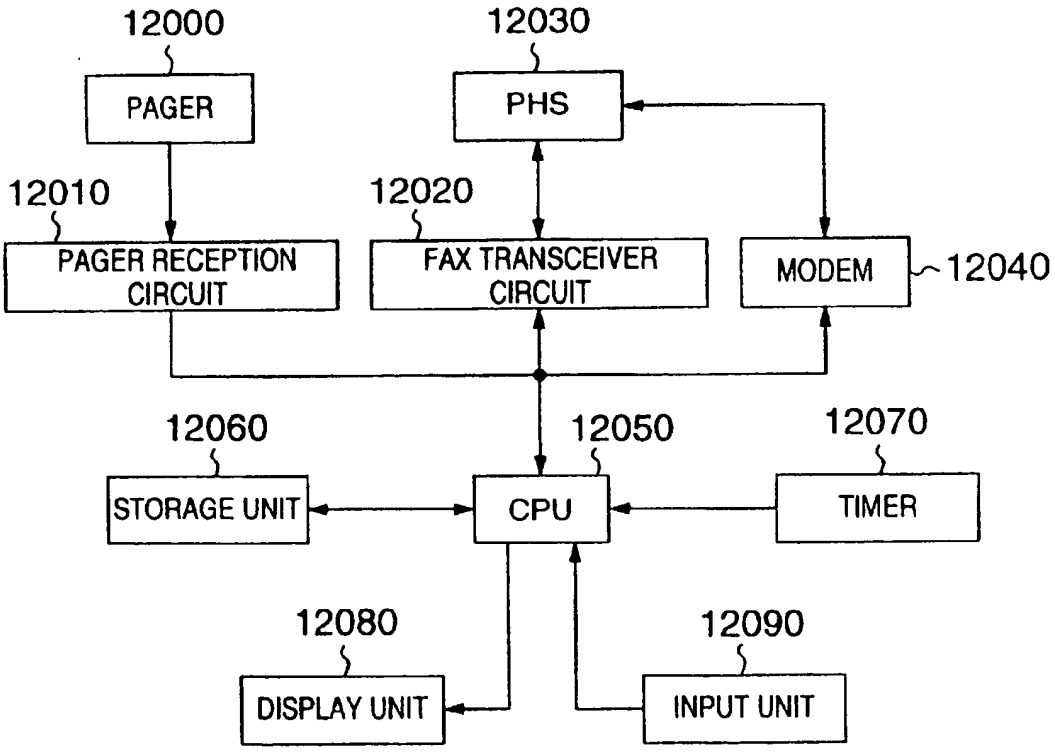

12000
PAGER
12030
PHS
12010
PAGER RECEPTION CIRCUIT
12020
FAX TRANSCEIVER CIRCUIT
MODEM
12040
12060
STORAGE UNIT
12050
CPU
12070
TIMER
12080
DISPLAY UNIT
12090
INPUT UNIT

FIG.33

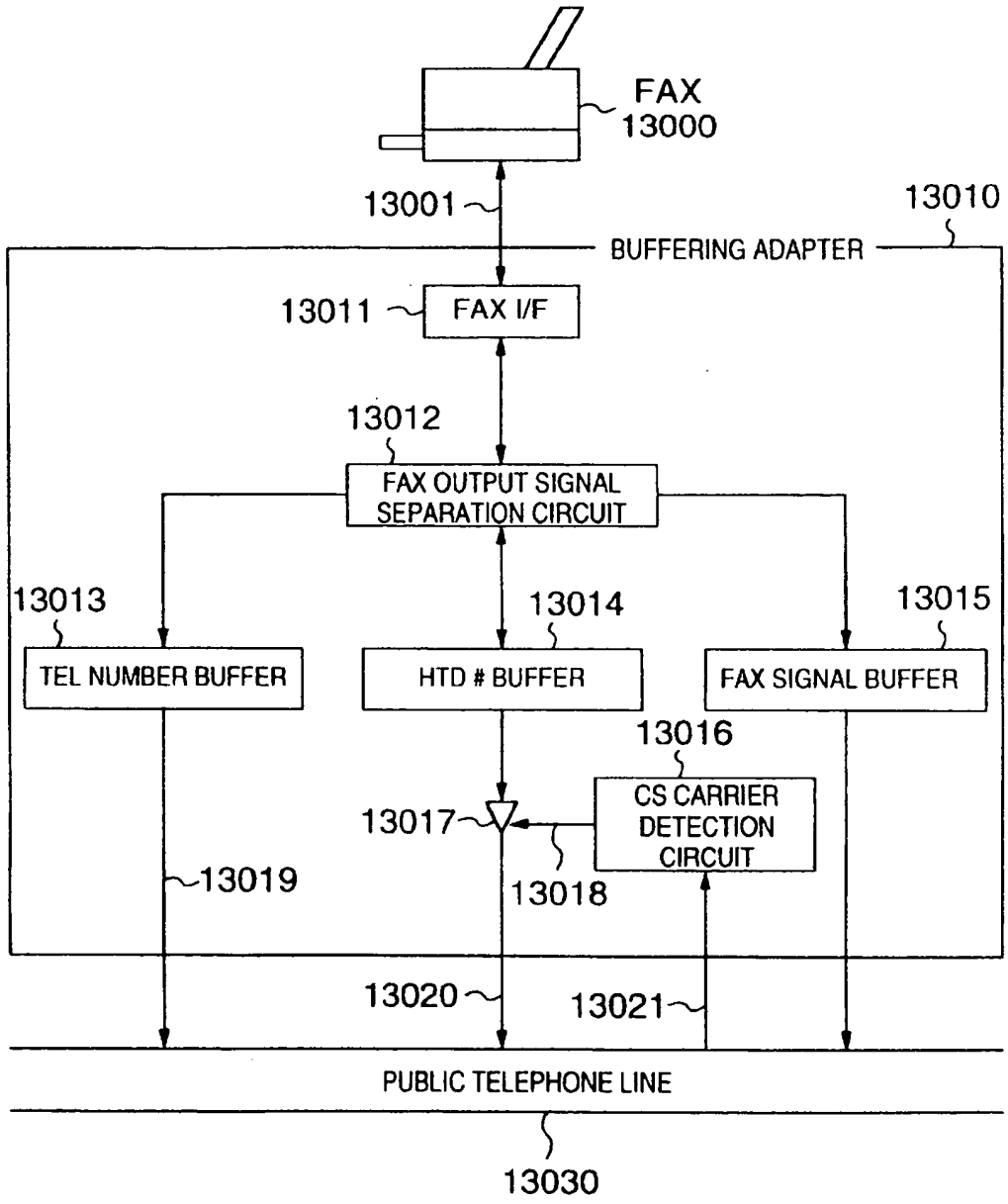

FAX
13000
13001
13010
BUFFERING ADAPTER
13011
FAX I/F
13012
FAX OUTPUT SIGNAL SEPARATION CIRCUIT
13013
13014
13015
TEL NUMBER BUFFER
HTD # BUFFER
FAX SIGNAL BUFFER
13016
CS CARRIER DETECTION CIRCUIT
13017
13018
13019
13020
13021
PUBLIC TELEPHONE LINE
13030

FIG.34

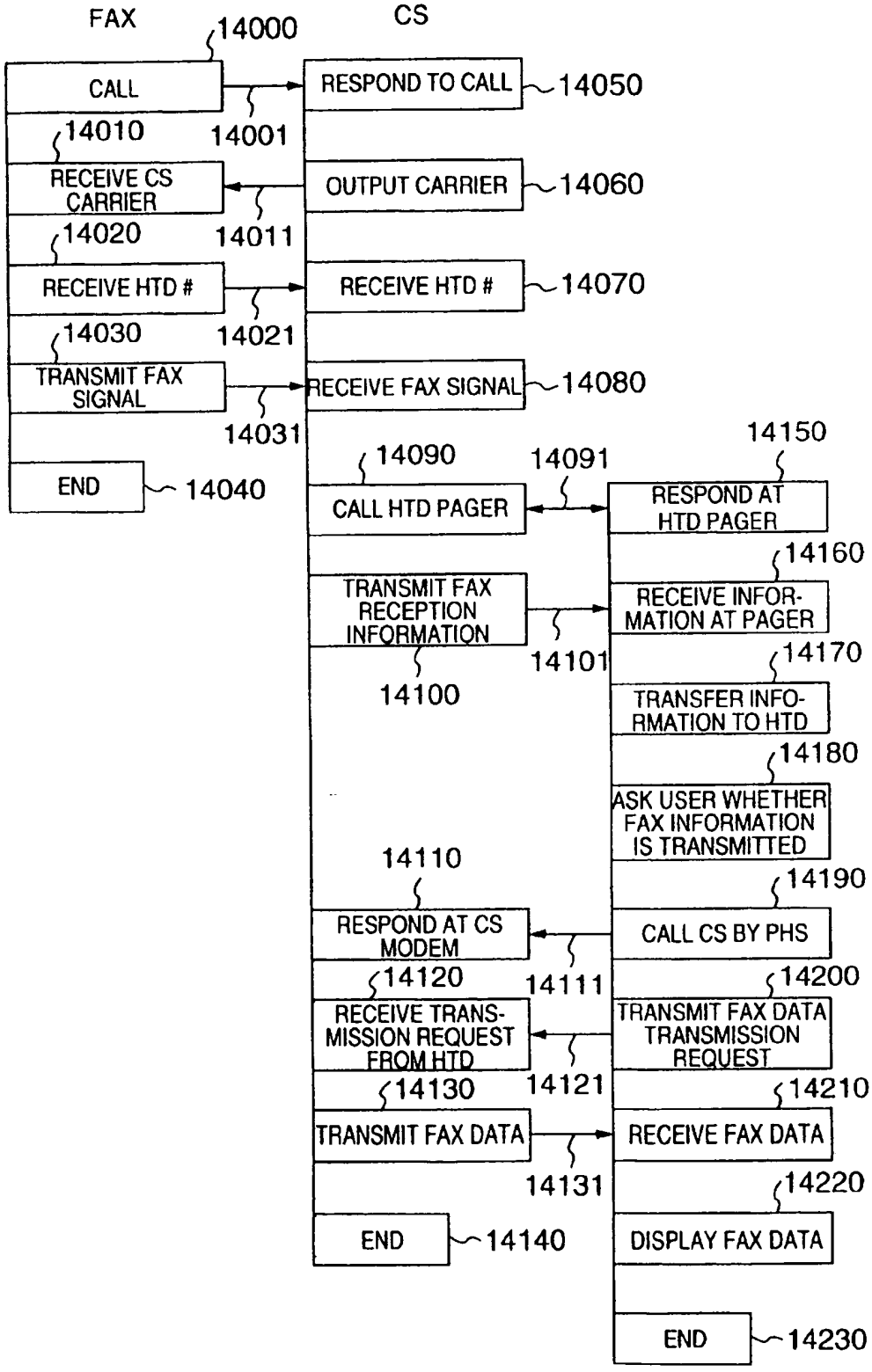

FAX
CS
14000
CALL
14001
RESPOND TO CALL
14050
14010
RECEIVE CS CARRIER
14011
OUTPUT CARRIER
14060
14020
RECEIVE HTD #
14021
RECEIVE HTD #
14070
14030
TRANSMIT FAX SIGNAL
14031
RECEIVE FAX SIGNAL
14080
END
14040
14090
CALL HTD PAGER
14091
14150
RESPOND AT HTD PAGER
14160
TRANSMIT FAX RECEPTION INFORMATION
14100
14101
RECEIVE INFORMATION AT PAGER
14170
TRANSFER INFORMATION TO HTD
14180
ASK USER WHETHER FAX INFORMATION IS TRANSMITTED
14110
RESPOND AT CS MODEM
14111
14190
CALL CS BY PHS
14120
RECEIVE TRANSMISSION REQUEST FROM HTD
14121
14200
TRANSMIT FAX DATA TRANSMISSION REQUEST
14130
TRANSMIT FAX DATA
14131
14210
RECEIVE FAX DATA
14220
END
14140
DISPLAY FAX DATA
END
14230

FIG.35

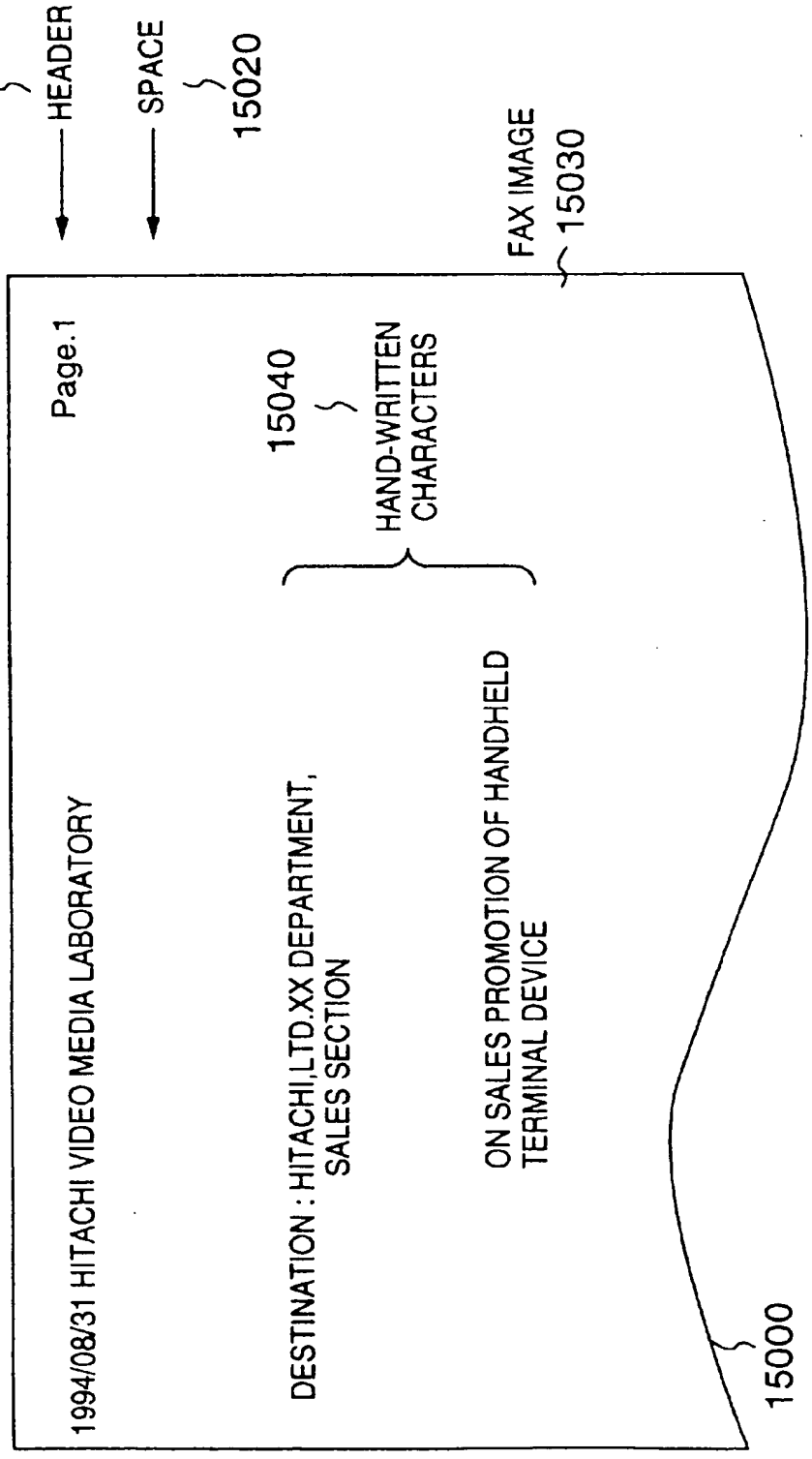

15010
HEADER
SPACE
15020
FAX IMAGE
15030
Page.1
15040
HAND-WRITTEN CHARACTERS
1994/08/31 HITACHI VIDEO MEDIA LABORATORY
DESTINATION : HITACHI,LTD.XX DEPARTMENT, SALES SECTION
ON SALES PROMOTION OF HANDHELD TERMINAL DEVICE
15000

FIG.36

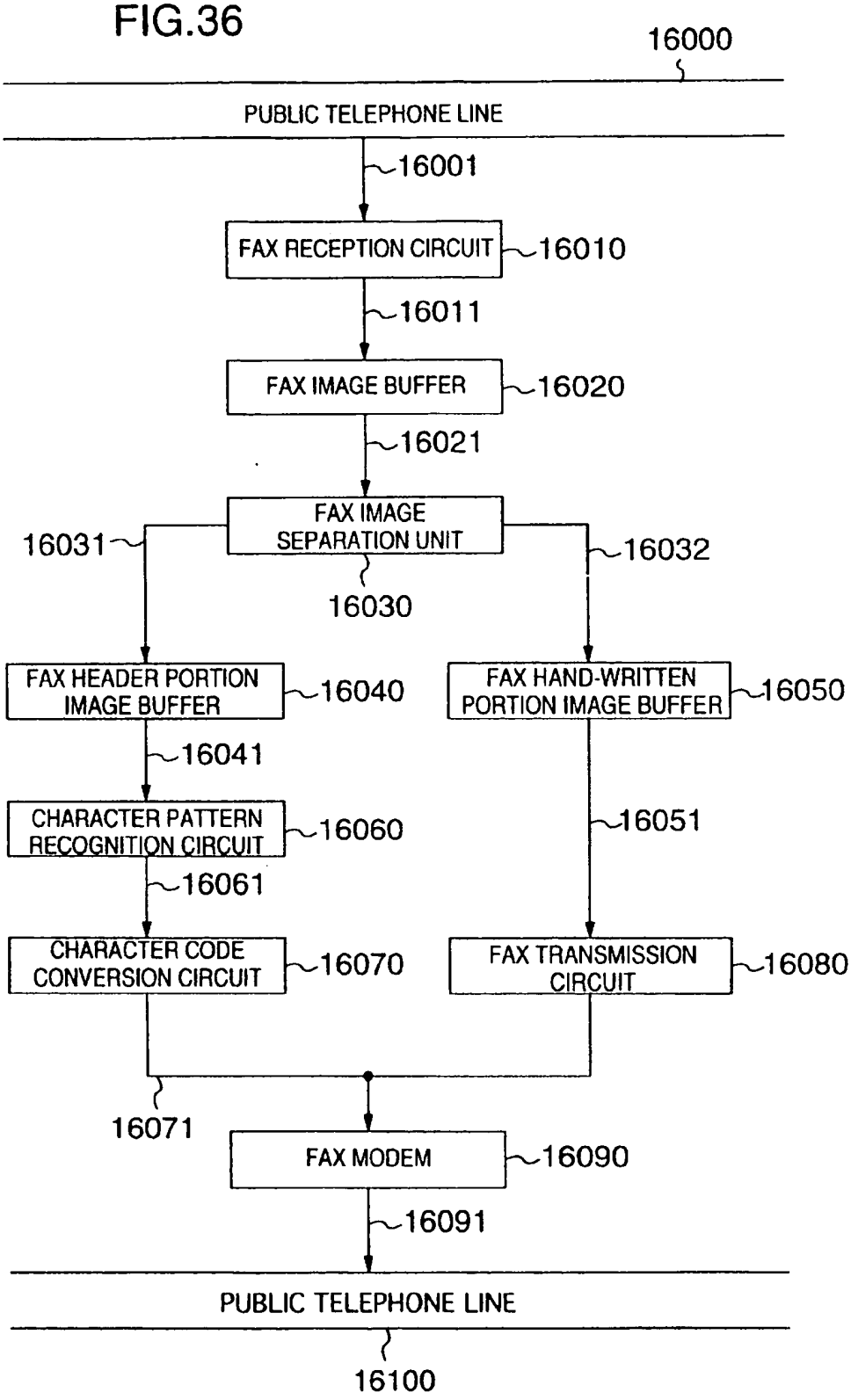

16000
PUBLIC TELEPHONE LINE
16001
FAX RECEPTION CIRCUIT
16010
16011
FAX IMAGE BUFFER
16020
16021
FAX IMAGE SEPARATION UNIT
16030
16031
16032
FAX HEADER PORTION IMAGE BUFFER
16040
FAX HAND-WRITTEN PORTION IMAGE BUFFER
16050
16041
CHARACTER PATTERN RECOGNITION CIRCUIT
16060
16051
16061
CHARACTER CODE CONVERSION CIRCUIT
16070
FAX TRANSMISSION CIRCUIT
16080
16071
FAX MODEM
16090
16091
PUBLIC TELEPHONE LINE
16100

FIG.37

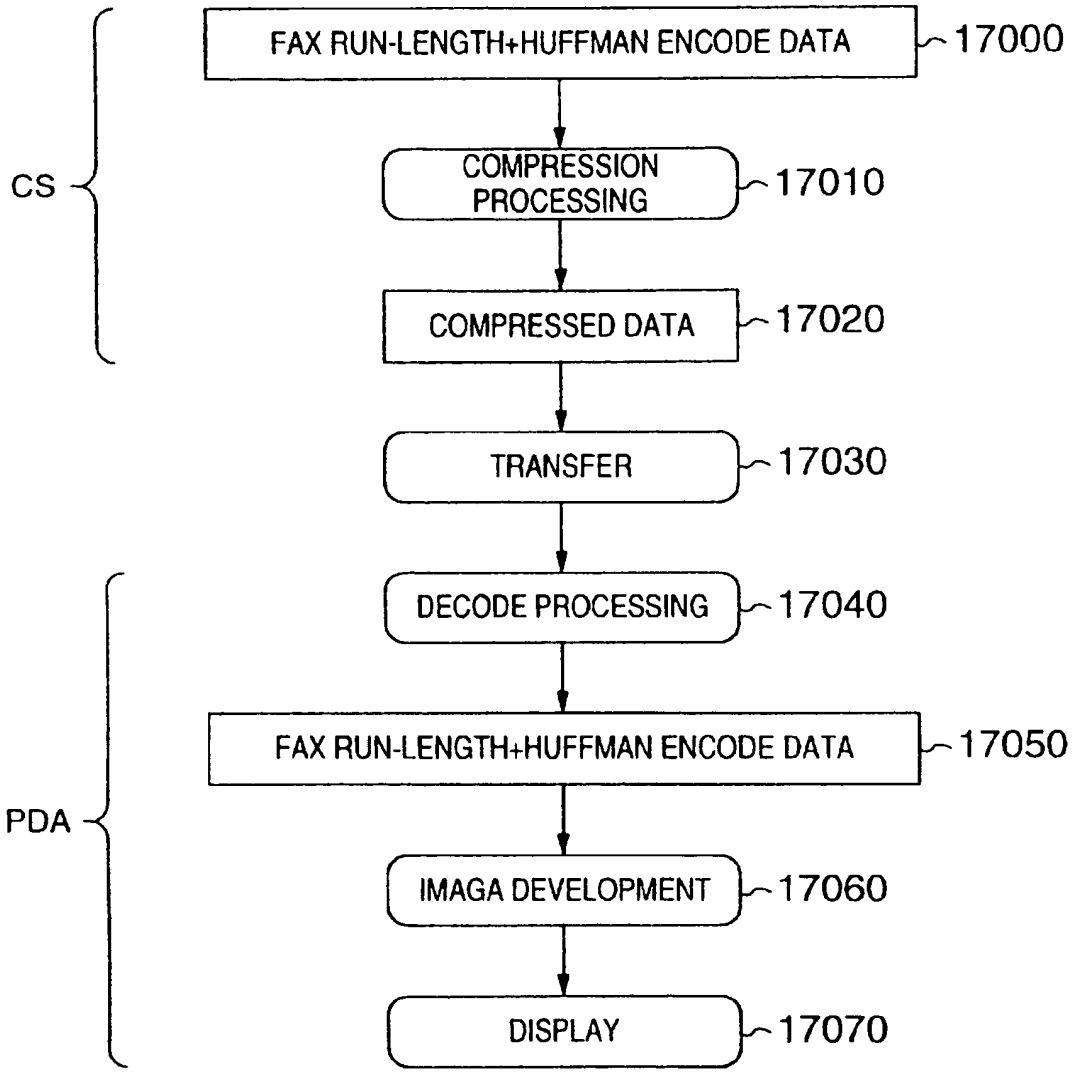

FAX RUN-LENGTH+HUFFMAN ENCODE DATA
17000
CS
COMPRESSION PROCESSING
17010
COMPRESSED DATA
17020
TRANSFER
17030
DECODE PROCESSING
17040
FAX RUN-LENGTH+HUFFMAN ENCODE DATA
17050
PDA
IMAGA DEVELOPMENT
17060
DISPLAY
17070

FIG.38

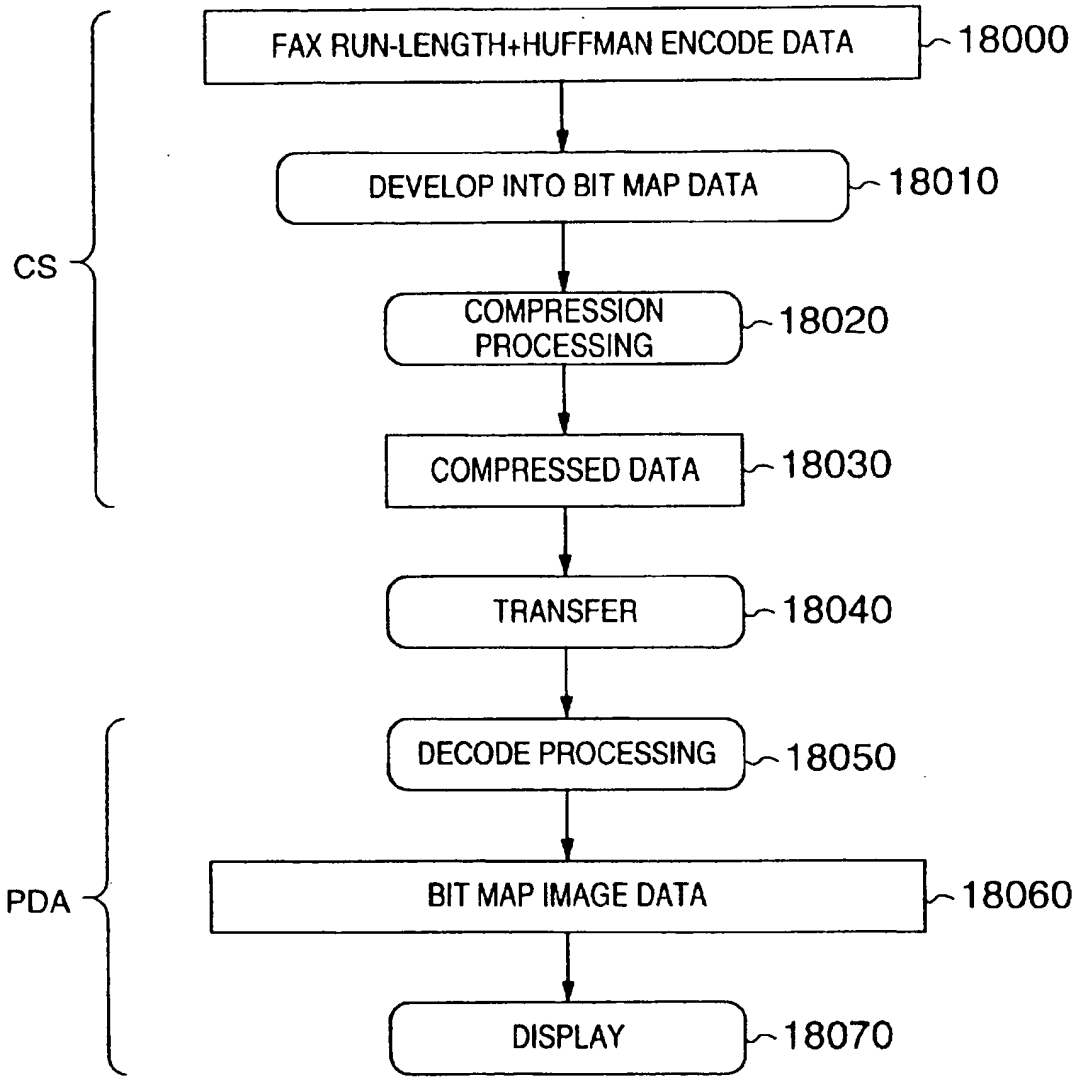

FAX RUN-LENGTH+HUFFMAN ENCODE DATA
18000
DEVELOP INTO BIT MAP DATA
18010
CS
COMPRESSION PROCESSING
18020
COMPRESSED DATA
18030
TRANSFER
18040
DECODE PROCESSING
18050
PDA
BIT MAP IMAGE DATA
18060
DISPLAY
18070

FIG.39

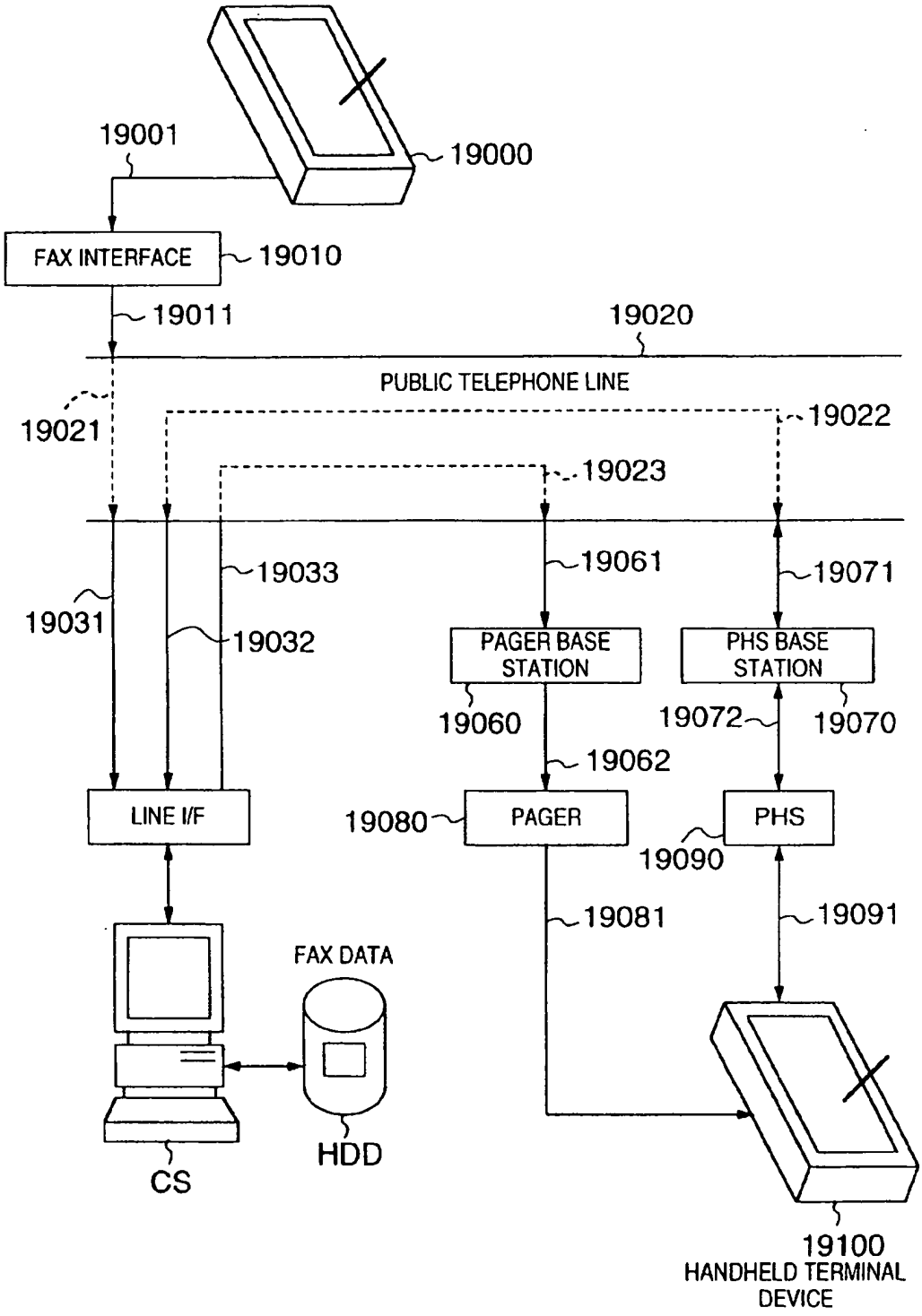

19001
19000
FAX INTERFACE
19010
19011
19020
PUBLIC TELEPHONE LINE
19021
19022
19023
19033
19061
19071
19031
19032
PAGER BASE STATION
PHS BASE STATION
19060
19072
19070
19062
LINE I/F
19080
PAGER
PHS
19090
19081
19091
FAX DATA
HDD
CS
19100
HANDHELD TERMINAL DEVICE

FIG.40

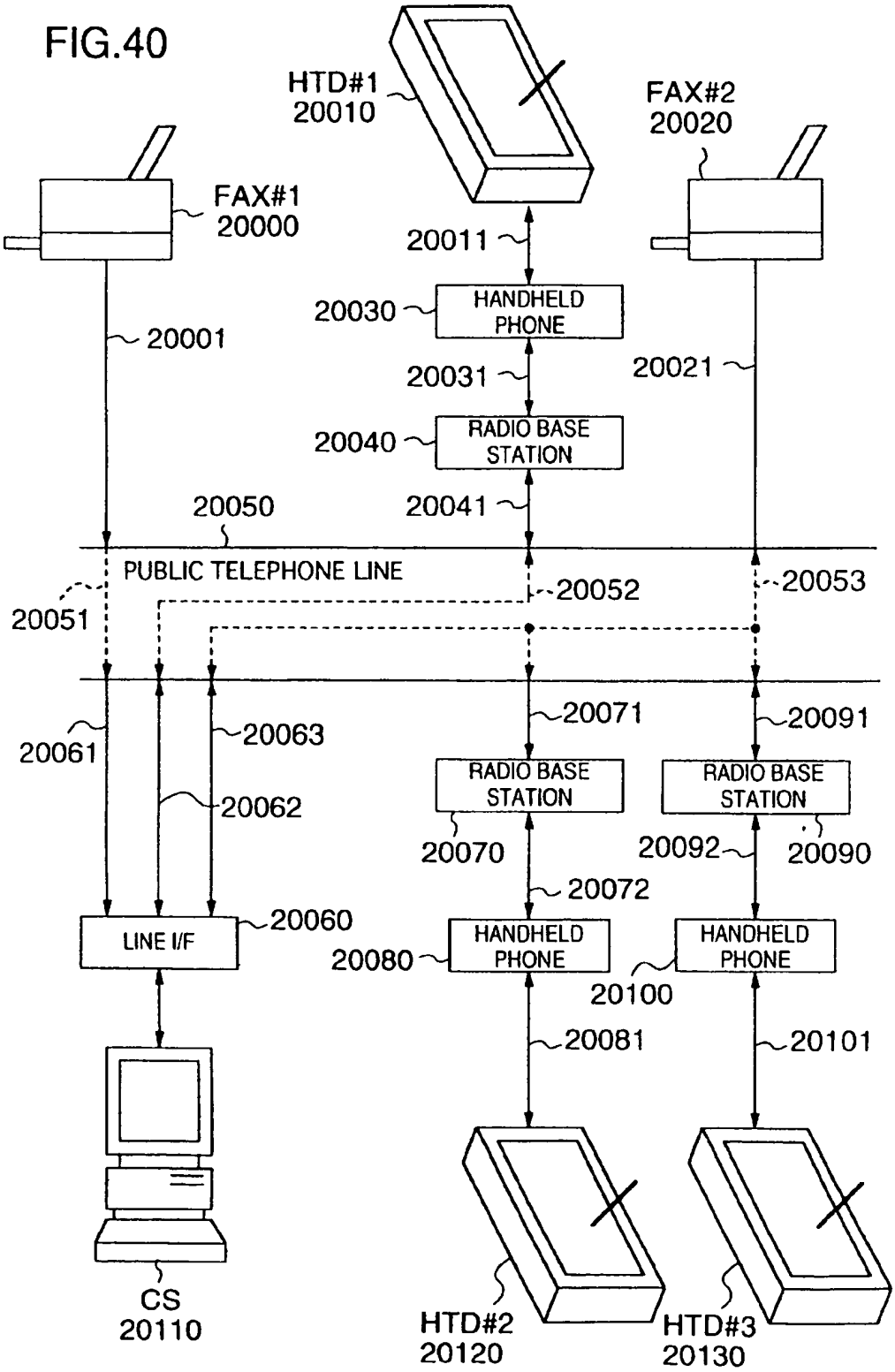

HTD#1
20010
FAX#2
20020
FAX#1
20000
20011
20030
HANDHELD PHONE
20001
20031
20021
20040
RADIO BASE STATION
20050
20041
PUBLIC TELEPHONE LINE
20052
20053
20051
20071
20091
20061
20063
RADIO BASE STATION
RADIO BASE STATION
20062
20070
20092
20090
20072
20060
LINE I/F
HANDHELD PHONE
HANDHELD PHONE
20080
20100
20081
20101
CS
20110
HTD#2
20120
HTD#3
20130

FIG.41A

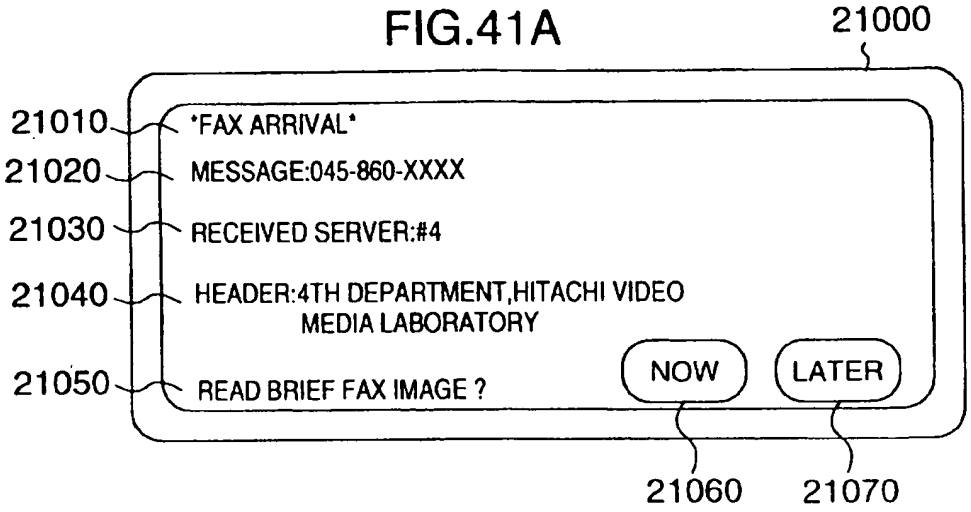


FIG.41B

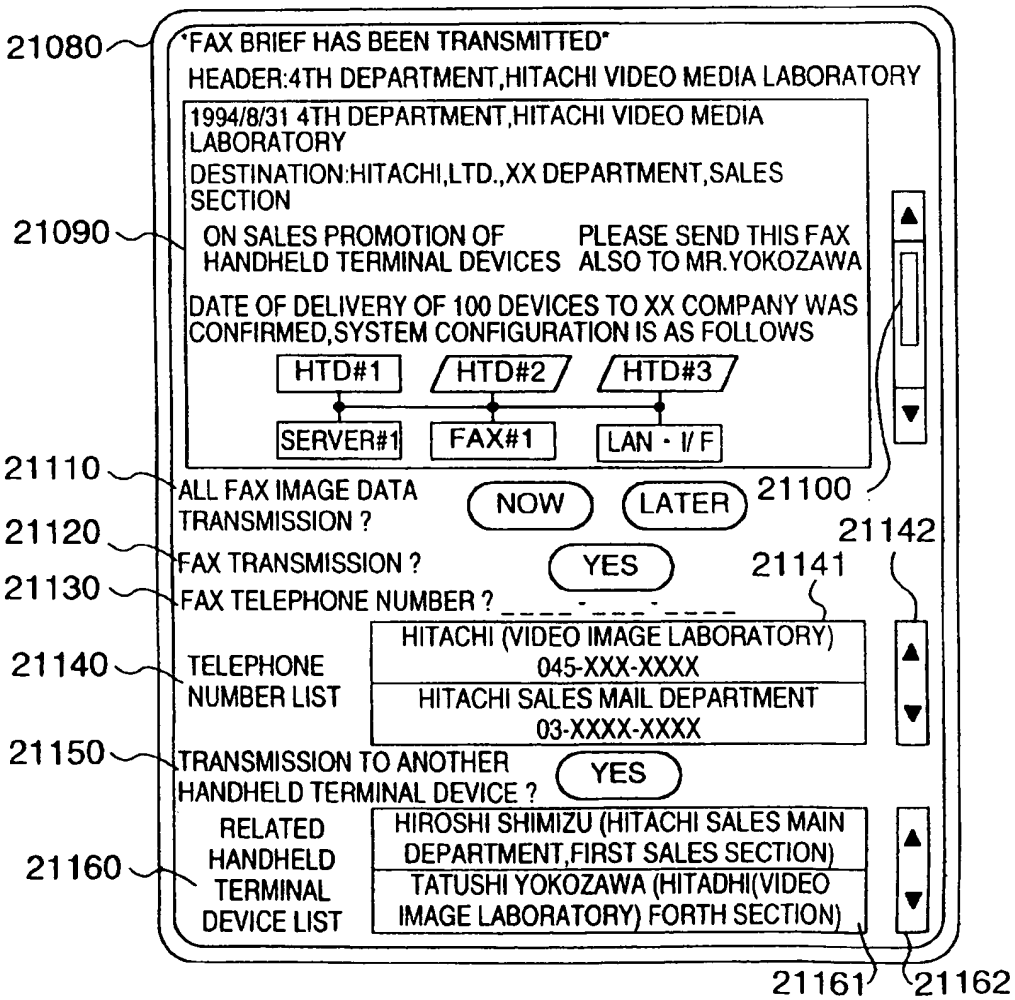
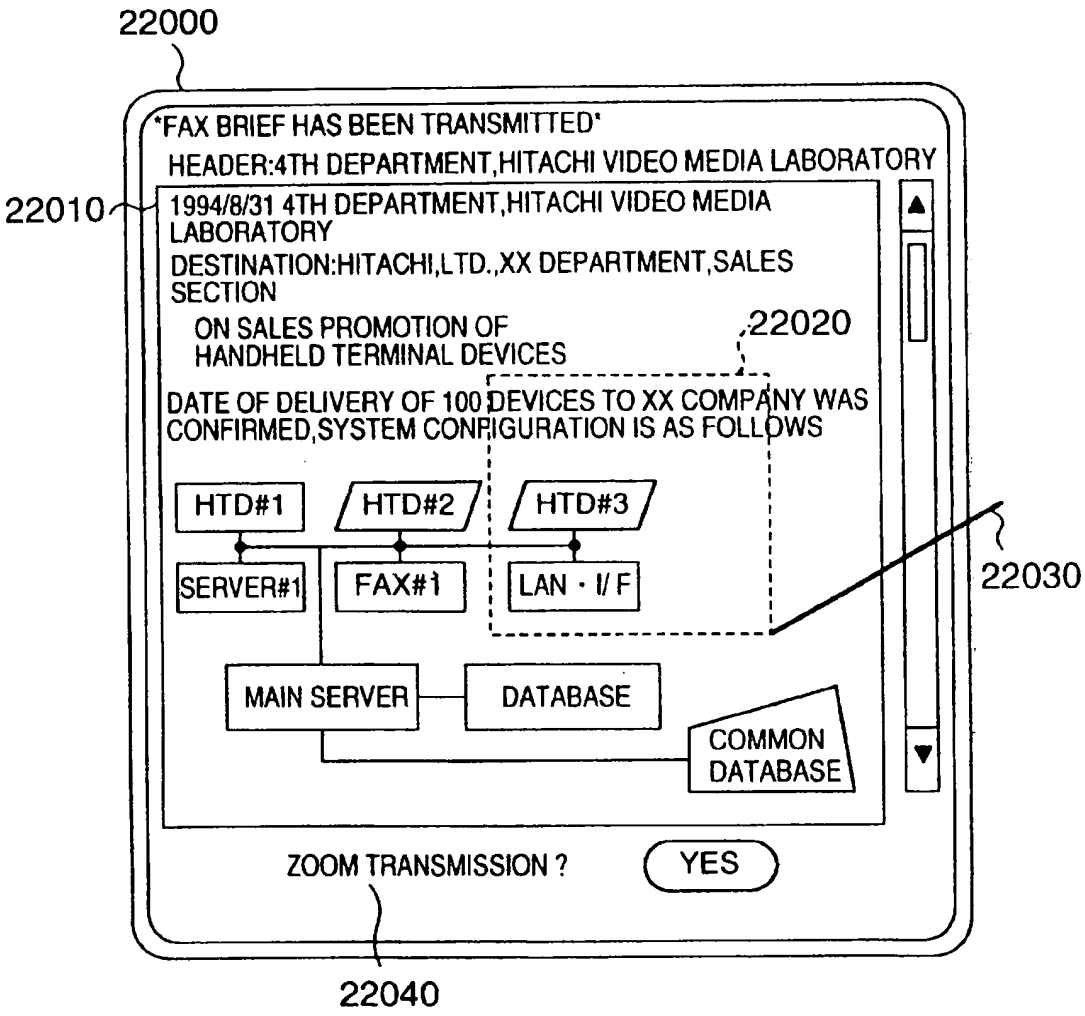


FIG.42


22000
"FAX BRIEF HAS BEEN TRANSMITTED"
HEADER:4TH DEPARTMENT,HITACHI VIDEO MEDIA LABORATORY
22010
1994/8/31 4TH DEPARTMENT,HITACHI VIDEO MEDIA LABORATORY
DESTINATION:HITACHI,LTD.,XX DEPARTMENT,SALES SECTION
ON SALES PROMOTION OF HANDHELD TERMINAL DEVICES
22020
DATE OF DELIVERY OF 100 DEVICES TO XX COMPANY WAS CONFIRMED,SYSTEM CONFIGURATION IS AS FOLLOWS
HTD#1
HTD#2
HTD#3
SERVER#1
FAX#1
LAN · I/F
22030
MAIN SERVER
DATABASE
COMMON DATABASE
ZOOM TRANSMISSION ?
YES
22040

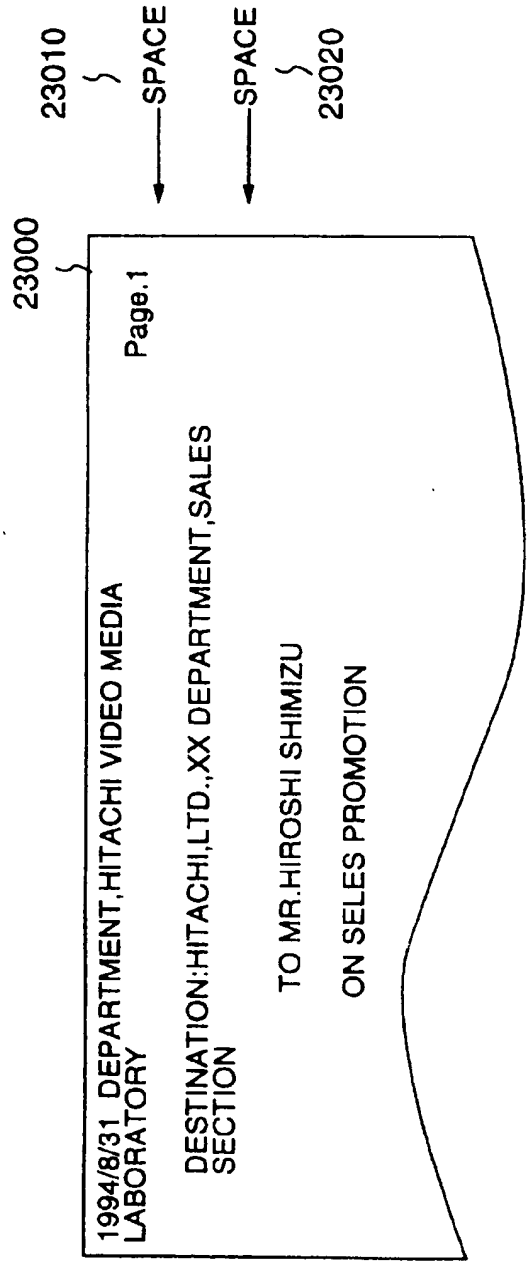


FIG.43A

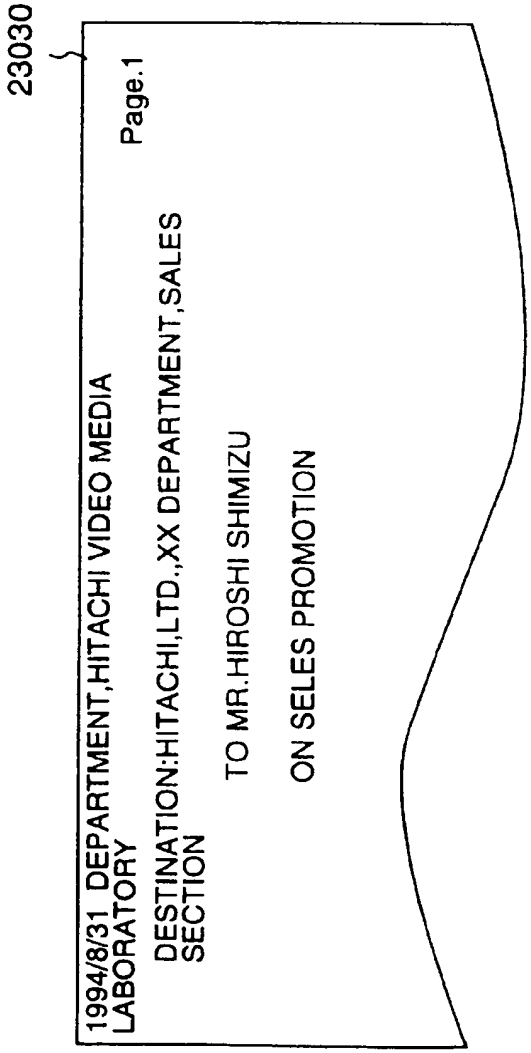


FIG.43B

DATA TRANSFER SYSTEM AND HANDHELD TERMINAL DEVICE USED THEREFOR

BACKGROUND OF THE INVENTION

The present invention relates to a data transfer system, and more particularly to a data transfer system for quickly and reliably transferring necessary data to a handheld terminal device used at any location.

Recently message reception devices (pager) for radio call services are rapidly prevailing because these devices are relatively compact and low in cost. Exchange of electronic mails, data files, and the like via BBS (Bulletin Board System) is popular among personal computer communications, over Internet, and among other communications. Under such circumstances, services ("Electronic Mail Reception Notice Services" by NIFTY-Serve or NTT DoCoMo) are provided for promoting quick information exchange by automatically notifying the reception of electronic mail to a pager possessed by a user when mail to the user has been received at a BBS the user subscribes to.

The "Electronic Mail Reception Notice Services" notify the pager user only of the reception of electronic mail. Therefore, although the user can be notified of the reception of electronic mail, the contents of the mail cannot be known. Even if the user is informed earlier of the reception of electronic mail from the page the contents of the electronic mail cannot be known until the user connects to the host station of BBS and reads the contents of the electronic mail by using a personal computer at an office or home. Therefore, depending upon the circumstances when a user is informed of the reception of electronic mail, quick information exchange is not necessarily ensured.

Apart from pagers, facsimiles (hereinafter abbreviated as "FAX") are known as an apparatus for quickly and reliably transferring information, in the form of image data such as characters and graphics drawn on a sheet of paper, to remote sites by using public lines such as telephone lines. Generally, FAX is used for transferring image data to a fixed site. If a callee is out of his/her office and at a different location, FAX installed nearest to the callee is checked in accordance with the schedule of the callee, and the image data is sent to that FAX. In this case, if the callee moves to a place different from the initial schedule, the image data cannot be sent directly to the callee.

In order to deal with such circumstances, two types of FAXes "Bishamon [HF-TM1]" and "Bishamon [HFTB1]" manufactured and sold by the present assignee are provided with a memory reception function and a transfer function. When the two types of FAXes receive image data from another FAX, they store it in an internal memory instead of printing it out on a paper sheet, and thereafter notify the callee of the reception of the image data by calling "pager" always carried by a callee of the FAXes. When the callee is informed of the reception of the image data by the pager, the callee uses another FAX installed nearby to connect to his/her own FAX, to remote-control it through the tone dial, and to have the image data stored in the internal memory sent to the callee via the nearby FAX. In this manner, the contents of the received image data can be known quickly, and the caller who sent information over a FAX does not necessarily have to pay attention to the schedule and present location of the callee.

However, even with these two types of FAXes, the contents of image data cannot be known quickly unless there is a FAX near the callee who is informed of the reception of the image data by a pager. Furthermore, since the contents

notified by the pager regard only the reception of image data, it is impossible to judge beforehand whether the contents of the image data should be read at once because they are important. Assuming that a callee is waiting for information regarding a very important issue and there is a call from the pager, the callee intercepts its work and finds a nearby FAX to perform an image data transfer operation described above, even if the contents of the image data are information regarding an issue not so important.

Low power consumption of a handheld or portable phone in combination with a pager is disclosed in JP-A-6-6302 and JP-A-6-97877.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a data transfer system and a handheld terminal device wherein when a callee is informed of the reception of data from its handheld terminal device, the callee can immediately check the contents of the received data on site.

The above object is achieved by arrival data acquisition means (e.g., an arrival data acquisition processing **500** in FIG. **11**) of a preferred handheld terminal device with the communication function of this invention. This means receives a new arrival message indicating the reception of new data and automatically controls an acquisition processing of the data in accordance with the contents of the new arrival message.

The new arrival message may contain data identifier information for identifying the data (e.g., a file ID **211** shown in FIG. **4**). In this case, the arrival data acquisition controlling means includes a new arrival message analysis processing unit for analyzing the received new arrival message and deriving the data identifier information (e.g., a command analysis at Step **501** of an arrival data acquisition processing **500**) and a received data transmission controlling unit for controlling a transmission process of the data in accordance with the data identifier information (e.g., a file fetch processing at Step **510** of the received data acquisition processing **500**).

The arrival message may contain data identifier information for identifying the data and connection information for accessing the data (e.g., a telephone number **212** shown in FIG. **4**). In this case, the received data acquisition controlling means includes a new arrival message analysis processing unit for analyzing the received new arrival message and deriving the data identifier information and the connection information, a connection establishment processing unit for performing connection processing of a communication line in accordance with the connection information (e.g., a line connection **511** shown in FIG. **12**), and a received data transmission controlling unit for controlling transmission processing of the data in accordance with the data identifier information.

The handheld terminal device may be provided with a retry control unit for controlling the connection establishment processing unit to repetitively perform communication line connection processing, until a predetermined number of retries are carried out or a communication line is established.

The handheld terminal device may be provided with a user confirmation processing unit for allowing the user to determine whether an acquisition processing for the data is to be performed or not (e.g., user confirmation **515** shown in FIGS. **12** and **16**). In this case, the received data acquisition controlling means controls the acquisition processing for the data in accordance with an instruction from the user confirmation processing unit.